FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:—

1925	
Oct. 15	Maj. C. K. Cochran-Patrick, D.S.O., M.C. "Aircraft Survey in Burma," before R.Ae.S.
Oct. 16	Sir Samuel Hoare at Lincoln Guildhall Meeting.
Oct. 24	Schneider Cup Race, Baltimore, U.S.A.
Oct. 24–27	Eliminating Trials for Coppa del Mare, Naples.
Oct. 28	Coppa del Mare, Naples.
Oct. 29	Mr. W. L. Cowley. "Aircraft Transport Economy," before R.Ae.S.
Nov. 4	Group-Capt. W. F. MacNeece. "The General Principles of Air Defence," before Royal United Service Institution.
Nov. 10	Wing-Com. T. R. Cave-Browne-Cave, C.B.E., F.R.Ae.S. "The Evaporative Cooling of Aero Engines and Condensation of their Exhaust Gas," before R.Ae.S.
Nov. 11–14	Eliminating Trials for Coppa d'Italia, Rome.
Nov. 12	Mr. H. B. Howard, A.F.R.Ae.S. "Some Problems in Aeroplane Structural Design," before R.Ae.S.
Nov. 15	Coppa d'Italia, Rome.

EDITORIAL COMMENT.

FROM time to time FLIGHT has urged the advisability of the R.A.F. doing propaganda work for British aviation by squadrons visiting foreign countries periodically, much as the Navy "shows the flag" by sending representative units on visits to foreign ports. As regards the Navy, not the least important result of such visits, apart from the very great service done in establishing friendly relations with other nations, is that very often orders for foreign warships are placed with British shipyards, and there can be little doubt that much the same would apply if the same methods were adopted for the Royal Air Force.

"Showing the Flag"

In this connection we would recall the following paragraph from our Editorial Comments on March 29, 1923, in writing of the Gothenburg Exhibition: "So far nothing has been said about sending a squadron of the R.A.F. As we have stated repeatedly in these columns, we consider a great deal of good might be done by sending such a squadron. It is understood that France is sending a squadron which will take part in the competitions, give demonstration flights, etc., and a similar squadron from this country would greatly help by 'showing the flag.' There is little doubt that the Admiralty will send more than one man-of-war to the marine exhibition which precedes the aircraft show, so why not an R.A.F. squadron?"

We are very glad to see that this question of showing the flag is now being taken up by the general Press, and in this connection we would call attention to an article by Maj. C. C. Turner, which appeared in the *Daily Telegraph* of October 3. In this article Maj. Turner utters a timely word of warning, pointing out that other nations are pursuing a vigorous policy of aeronautical propaganda by sending aviation missions abroad to demonstrate the capabilities of their aircraft. That orders follow as a direct result of such demonstrations can scarcely be denied, and yet, although British machines and engines are second to none in scientific design and skilled workmanship,

practically nothing is being done at present to convince other countries of this fact. We ourselves know it as a fact, but unless that knowledge can be spread to other nations it is going to be of little avail in getting orders for aircraft from foreign countries. As we have stated, we are extremely glad to see that such an influential paper as the *Daily Telegraph* has taken this matter up, and we sincerely trust that other prominent daily newspapers will follow suit.

In matters of this sort the excuse is generally used that the Treasury is the stumbling-block, and that, although the Air Ministry is willing or even anxious to help in any way, there is no money available for such propaganda. The answer to this contention, which certainly has a great deal of truth in it, is, of course, that if the pressure of public opinion be strong enough the Treasury will have to yield. It cannot be considered, however, that the Air Ministry is entirely without blame in the matter, or is doing all that it might do to help British aviation in general (and in so doing incidentally, helping itself and the R.A.F.). Maj. Turner, in the same article, refers to an anomaly in connection with the projected flight from Egypt to Nigeria, across Africa. He points out that the machines which it is proposed to use (D.H.9a's) are fitted with American engines. That is scarcely the best way to demonstrate the qualities of British aviation, and if the flight is a success there is little doubt, as Maj. Turner points out, that America will claim a large share of the credit. Indeed she would be foolish if she did not do so.

The one thing which matters above all else is that the Royal Air Force should be equipped with the best possible machines and engines that can be obtained, and if British firms had failed to produce machines or engines of the best possible type, while another nation had turned out superior types, then there might be some excuse for obtaining the best types from abroad. In this case such is most emphatically not the case, as probably no one, least of all the Americans themselves, would claim that the Liberty is now the best engine in the world. Of its type, of course, the Liberty is quite a good engine and is giving good service in the R.A.F., but no one could certainly regard it as being superior to modern British aero engines in any way, and the excuse, therefore, that it is the best engine for the job cannot be advanced.

It might be, of course, that the reason is that the particular R.A.F. squadron about to attempt the flight across Africa happens to be equipped with this type of engine, but this is scarcely a valid reason for making what is, after all, mainly a propaganda flight with machines fitted with foreign engines, and we do most earnestly urge that the matter be reconsidered, and that machines fitted with good British engines be used for the flight. As Maj. Turner points out in the heading of this particular paragraph in his article, it is equivalent to "showing the rival's flag," and competition in the aircraft industry is so keen nowadays that no nation can afford to do that, least of all the British.

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Records

In the same article in the *Daily Telegraph* Major Turner refers to another matter to which we have so persistently called attention in FLIGHT, namely, that of establishing world's records. As he points out, there are at the present moment a considerable number of British machines in existence capable of beating world's records in various classes, but owing to the Air Ministry's attitude these machines are regarded as "secret" and are not allowed to establish such records, although perfectly capable of doing so. This is a question which FLIGHT has dealt with repeatedly during the past couple of years, and here, again, we are very glad that the general Press is taking up the matter.

It is obvious that a journal like FLIGHT, in expressing these views, may easily be suspected of not being entirely unbiassed, but such considerations do not apply to the daily Press, and if other influential journals will only take up these various points raised by Major Turner, there is little doubt that the Press can do a tremendous amount of good in bringing home to the general public the fact that aviation is more and more all-important to the British Empire, and that no effort must be spared to enable Britain not only to hold her own in the face of the intense foreign competition existing at the moment, but attain a position of pre-eminence much as she has done in the matter of shipping and shipbuilding in the past. In this matter of records there is no question whatever of Treasury sanction or the voting of extra money, but merely that those in authority at the Air Ministry should change the policy which has hitherto prevented machines built for the Royal Air Force from establishing world's records.

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Why Helicopters?

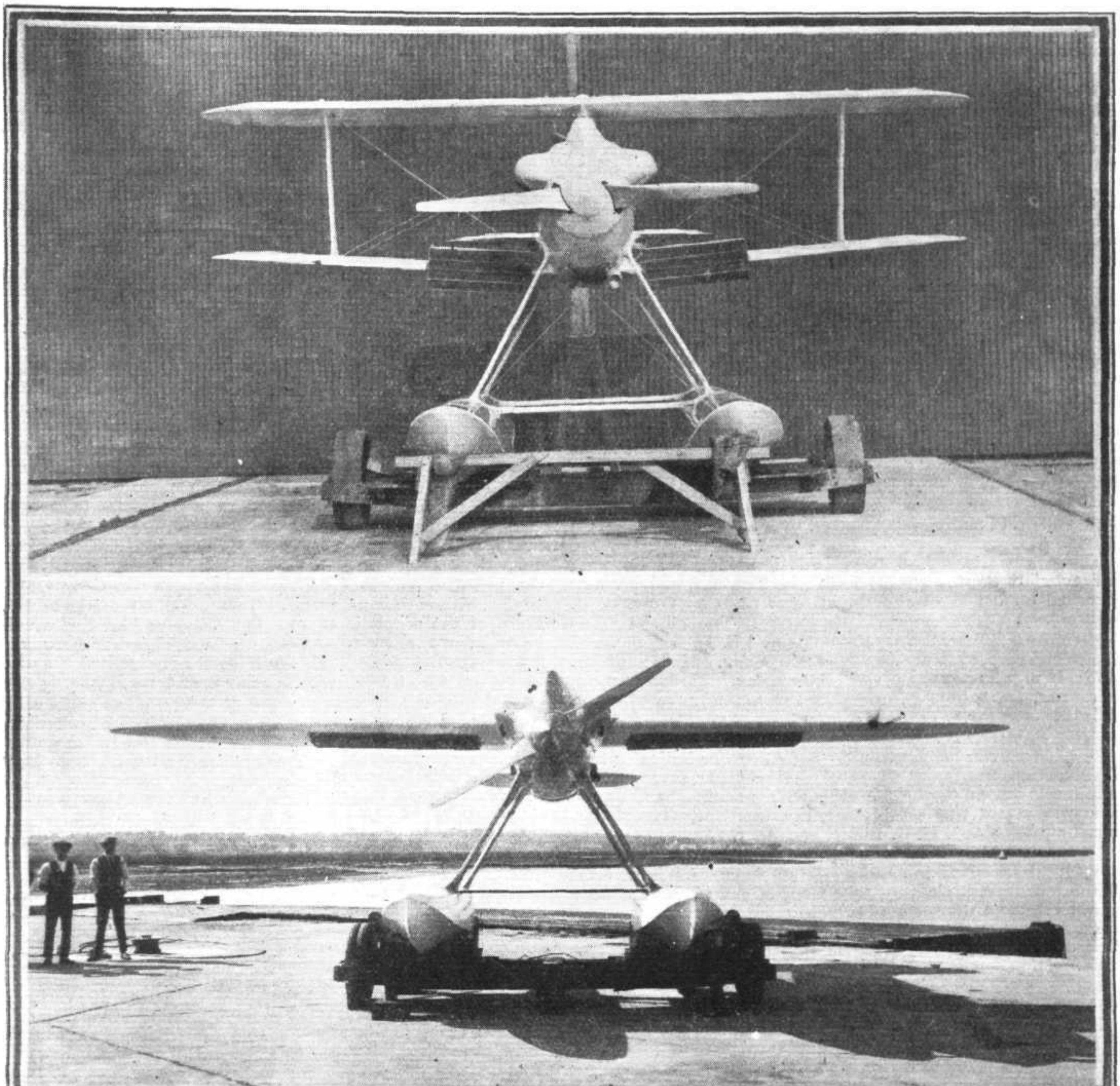
Attention has lately been drawn to a novel form of flying machine which is at present being tested at the Royal Aircraft Establishment at Farnborough, *i.e.*, the Cierva "Autogiro" This machine is the invention of a Spanish engineer, Don Juan de la Cierva, who has been working on the problem for several years, and who has gradually been developing his machine, until now it is considered that all the main difficulties have been overcome. Particulars of an early model of the Cierva "Autogiro" were published in FLIGHT for May 24, 1923, and September 20, 1923. In the latest type, which has been flown at Farnborough by Mr. Frank Courtney, the top speed attained is not, we believe, very high, but the landing speed is extremely low, the figure of 20 m.p.h. having been mentioned. While it is still uncertain whether the "Autogiro" principle has any useful application for commercial aircraft, owing to the apparant difficulty of obtaining high horizontal speed combined with a large useful load, it would seem that if there is any utility for a helicopter, and by offering a prize for helicopters the Air Ministry appears to indicate that it considers that there is a military use for a helicopter type of machine, then the "Autogiro" comes sufficiently near to fulfilling requirements. Presumably, the main advantage of the helicopter for military purposes is its assumed ability to "hover." The "Autogiro" certainly will not hover, but if it can be flown at a speed of 20 or 30 m.p.h., it would seem that for purposes of observation this would approximate near enough to hovering, since if such a machine were cruising round at 30 m.p.h., at an altitude of several thousand feet, it would be, to all intents and purposes, equivalent to hovering. At any rate the "Autogiro" has one very great advantage as compared with the helicopter. *It does fly*. It would certainly appear that, instead of wasting money on the Brennan helicopter, which has now been under construction for years, and which seems no nearer being a success, the authorities might devote more attention to the "Autogiro."

THE SCHNEIDER CUP RACE

Britain's Chances Considered Good

FOR a time the announcement that one of the most severe gales experienced for many years had, among other things, blown down the tent hangar in which the Supermarine-Napier S.4 was housed and damaged the tail 'plane, caused considerable uneasiness in British aviation circles, since it looked as if the damage might not be repairable. The latest news to hand, however, indicates that damage to the tail, although serious, can be repaired, and thus Great Britain will not, it is hoped, be deprived of one of its challengers. The wisdom of sending Mr. R. J. Mitchell, the Supermarine designer, across is now apparent, since nobody else would have been so well able to judge whether or not repairs could be safely made.

While one can thus rejoice that the accident is not likely to have as serious consequences as was at first feared, the use of tent hangars for such valuable racing machines seems open to criticism. Not that we would suggest for a moment that the Americans have jeopardised the British machines by so housing them. In point of fact, the American defenders and other valuable machines are housed in precisely similar hangars, and several of these were in as great danger, but it does seem rather unwise to spend a vast amount of money on racing aircraft, and then put them into flimsy tents that are likely to be blown down.



THE BRITISH SCHNEIDER CUP CHALLENGERS: These two front views give an excellent idea of the manner in which head resistance has been cut down to a minimum. Incidentally, it is of interest to note that the two photographs are approximately to scale, i.e., the Supermarine S.4 is of slightly larger span than the Gloster Napier III. It was on the Supermarine-Napier S.4 that Capt. Biard established a new world's record for seaplanes by flying at an average speed of 226·752 m.p.h.

The British team is now hard at work, but needless to say, found time to attend the Pulitzer Race at Mitchell Field, which was won by Lieut. Cyrus Bettis on a Curtiss-Army Racer at the average speed of 248·99 m.p.h. Lieutenant

Alford Williams, on the Curtiss-Navy Racer, which is practically identical with the Curtiss-Army, averaged 241·71 m.p.h., which is a little below the speed at which he won the Pulitzer last year (243·78 m.p.h.). As it is the Curtiss-Navy machine, which will, fitted with floats, take part in the Schneider Cup Race, the performance of this machine was naturally watched with the keenest interest by the British team. Experts in this country consider that if the speed put up by Lieut. Williams represents reasonably the maximum possible around a circuit, the British challengers should have a sporting chance in the Schneider Cup Race. There is, of course, the possibility that as there were no foreign machines challenging the Americans in the Pulitzer, Williams was not going "all out" in that race, being content to leave it to the Curtiss-Army racer to win the Pulitzer, and thus avoiding giving the foreign challengers an indication of the true capabilities of the Curtiss-Navy racer, but this does not seem very likely. On the established figures it is, as we have already mentioned, considered that the British machines should have a sporting chance in the Schneider Cup Race.

There can be little doubt that the fitting of floats will reduce the speed by something like 30 m.p.h., which would bring the speed of the American defenders down to about 210 m.p.h. As the Supermarine has averaged 226·752 m.p.h. over a straight course (and it seems likely that even this does not represent the best of which the machine is capable), there should be something in hand to allow for flying over a triangular course. The Gloster-Napier III also is known to be capable of very high speeds, although it has not so far been able to establish official figures, and altogether there is, we think, every reason to believe that the British challengers will put up a very fine fight. As we have previously pointed out, cornering will play a very important part, and the American pilots have an advantage in having had more opportunity of practising, but the British pilots are now hard at work, and as presumably the American defenders will also be out practising there should be an opportunity of watching their cornering, and if there are any hints to be picked up we may be sure the British team will not fail to observe them.

The practice flights during this week and the early part of next week should help materially to get the British pilots into "form," and the thoughts of all interested in aviation will be with them frequently from now onwards. So far the prospects are considered not unfavourable, and the next few days should give a good idea of our chances.

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THE BRITISH SEAPLANE WORLD'S RECORD

Some further Facts and Figures

LAST week we were able to record briefly the magnificent performance put up by the Supermarine-Napier S.4 Schneider Cup Racer in establishing, on September 13, a new world's record for seaplanes by flying at the average speed of **226·752** m.p.h. The flight was made over Southampton Water, and, as prescribed by the new regulations of the *Federation Aeronautique Internationale*, it consisted of two flights up-wind and two down-wind over a 3 km. (1·865 miles) course.

The course itself had been laid down by the Borough Surveyor of Southampton, and the flights were officially observed on behalf of the Royal Aero Club by Capt. C. B. Wilson and Commander H. E. Perrin. The official timekeepers were Messrs. A. G. Reynolds and S. D. Bidlake, and the following speeds were observed: first run, 364·865 km./hr. (226·716 m.p.h.); second run, 360 km./hr. (223·693 m.p.h.); third run, 362·416 km./hr. (225·194 m.p.h.); fourth run, 372·414 km./hr. (231·406 m.p.h.). Average, 364·924 km./hr. (226·752 m.p.h.).

The fourth run at nearly 231½ m.p.h. rather indicates that the machine was not "all out" on the other three, and if account is taken of the fact that the machine had, at the time the record was established, not been fully tested out, nor the pilot, Capt. H. C. Biard, become thoroughly familiar with the handling of it, it seems reasonable to suppose that the actual speed of the Supermarine-Napier S.4 is at least 230 m.p.h. in still air, probably a shade more. It is worthy of note that no dive whatever before entering the measured course was permitted, and that therefore the figures are not "boosted" ones arrived at by taking a long dive at the starting line. At no time during the record flight was the machine at any appreciably greater altitude than that maintained over the measured course.

In view of the fact that the machine had not yet had time to be thoroughly tuned up, the flight is more than creditable, and incidentally, it provides a striking example of a subject mentioned in our Editorial Comments this week—namely, that if the Air Ministry would permit machines to try for world's records a considerably greater number might stand to the credit of Great Britain. The Supermarine-Napier S.4 is not, of course, a Service machine, but it, like the Gloster-Napier III, has been ordered by the Air Ministry and lent to the constructors for the purpose of the Schneider Cup Race. There is no good reason why several British service machines, known to be capable of beating existing world's records, should not be allowed by the Air Ministry to do so. They are no more "secret" than were the two Schneider Cup machines up till a week or so before their departure for the U.S.A.

As regards the record itself, it beat the existing one (standing to the credit of Lieut. Cuddihy of the U.S. Navy Air Service) by 62·24 km./hr. (38·7 m.p.h.), so that there is no doubt in the matter. The increase in speed is definite and unmistakable. Considering the relatively small experience which this country has had of racing seaplanes, the achievement is one of the greatest in the history of British aviation, and reflects the very greatest credit on all concerned.

In this connection mention should, of course be made first and foremost of the Supermarine Aviation Works, who, in spite of very scant support by the Government until the last few years, has retained its faith in the ultimate recognition of the seaplane. Ever since the formation of the firm in 1913 by Mr. Noel Pemberton Billing, who has not, incidentally, been associated with the company for years, the firm has had to fight a peculiar apathy in Government circles, although it might have been thought that the advantages of the seaplane to an Island Empire like ours would have been obvious to the meanest intelligence. FLIGHT is gratified to be able to claim to have always realised the vital importance of this type of machine, and to have preached in and out of season the gospel of the seaplane until often we have feared our readers must have become tired of reading about the seaplane. The correctness of our views, and those of the few firms who have remained true to the seaplane ideal, has now been amply demonstrated.

To the Napier Company likewise must go much of the credit, since without the extraordinarily efficient Napier racing engine the record could scarcely have been established. The two companies deserve success in the Schneider Cup race, as does also the Gloucestershire Aircraft Company, who have strenuously developed the land-racing machine for a number of years, and who have, during the last two years, turned their attention to the racing seaplane.

We should be failing in our duty if we omitted to mention that the Fairey-Reid Duralumin propeller used played a very important part. At the high tip speeds developed it is doubtful whether a wood propeller would have stood up to the strain, and in any case the thick sections that would have been necessary to give strength in a wooden airscrew would hardly have given the efficiency realised by the Fairey-Reid. In this connection one should not forget the Vickers Company, who supplied the Duralumin from which the airscrew was made, upon the quality of which the capacity of the airscrew to withstand the terrific loads depended to such great extent. Duralumin is now beginning to come into its own, and Vickers, Ltd., will, we hope, reap their due reward for having realised, so many years ago, the possibilities of this material in aircraft construction.

If we state that the Supermarine-Napier S.4 was covered with "Mallite," while the engine was run on Shell motor spirit and lubricated with Castrol, while the plugs were K.L.G.'s, it will be seen that the effort was very much a co-operative one, in which quite a large proportion of the British aircraft industry shares. Congratulations to all concerned, and may this prove the first of a long list of world's records to be regained by Great Britain. All our industry needs is a chance to show what it can do.

10,000 MILES OVER THE SEA

"Southampton" Flying-Boats' Cruise

THE Air Ministry announces that a most instructive and successful cruise has recently been carried out by No. 480 Coastal Reconnaissance Flying-Boat Flight, which is part of the Coastal Area Command, R.A.F., and is based at Calshot, Hampshire.

The flight has recently been re-equipped with new twin-engined flying-boats of the "Southampton" type, which are built by the Supermarine Aviation Works, Ltd., of Woolston, Southampton. They are fitted with two 450 h.p. Napier "Lion" engines. The cruise was intended to demonstrate the facility with which modern flying-boats can work away from their own base under any weather conditions. The flying-boats operated in conjunction with H.M. Cruiser *Calliope* and two of H.M. Destroyers. The composition of the Flight was four "Southampton" flying-boats, and their itinerary was as follows, the duration of the cruise being from September 3 to September 23, 1925 :—

R.A.F. Base, Calshot to Portland, and thence to Cattewater, Plymouth, and Cattewater to Pembroke, where the flying-boats secured to moorings and refuelled from the destroyers; Pembroke to Carrickfergus, Belfast Lough. *En route* an exercise was carried out with H.M. ships. One flying-boat was forced to land near Wicklow Head owing to slight engine trouble, and was taken in tow by H.M.S. *Calliope*, arriving safely at Carrickfergus the following day. Three flying-boats then proceeded to Campbeltown, where exercises were continued with H.M. ships. The fourth machine was left behind at Belfast for repairs.

Throughout this period bad weather was experienced, the wind at times reaching gale force, with rain and low clouds. Visibility at times was reduced to 200 yards, with clouds as low as 100 ft. During a gale on September 15 the three flying-boats landed safely at Campbeltown, on completion of an exercise, and refuelled from H.M.S. *Calliope* without any difficulty, while the gale was still at its height. All flying-boats handled well on the water and rode well at their moorings.

From September 16 to 22 demonstration flights were carried out over such places as Ardrossan, Ayr, Oban, Greenock, Gourock, Glasgow, Belfast, and other towns in the Belfast Lough. Much local interest was displayed at these places, in some cases the whole town turning out to watch the flying-boats.

The Flight parted company with the Naval forces at Campbeltown on September 21, and flew to Belfast, where it remained a day with Air Vice-Marshal F. R. S. Scarlett, C.B., D.S.O., Air Officer Commanding Coastal Area, R.A.F., and Air Commodore C. L. N. Newall, C.M.G., C.B.E., A.M., Air Officer commanding, Special Reserve and Auxiliary Air Force, who arrived the same evening in another "Southampton" from England.

On the following day a demonstration formation flight was made by four of the flying-boats, and surprise was expressed in Belfast that the aircraft should have been able to go up, as it was raining and blowing hard and visibility was poor owing to the mist.

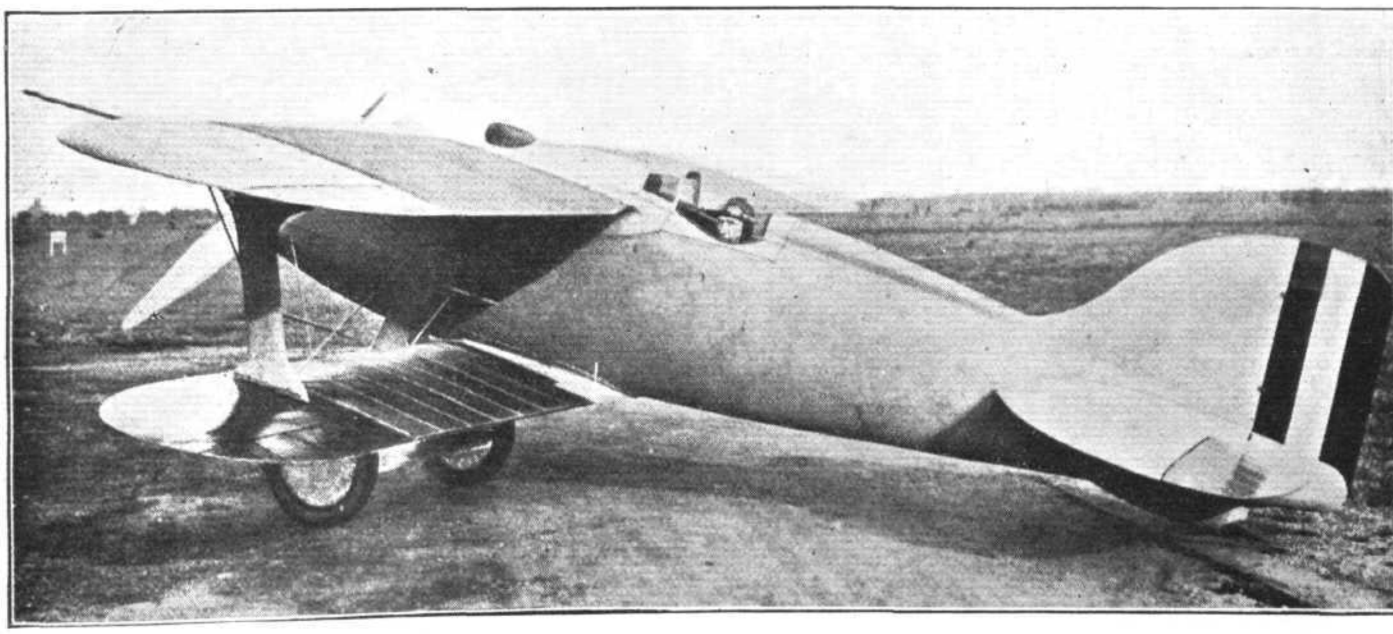
The Flight left for Calshot on September 23, two boats making a non-stop flight, a distance of 510 miles in 5¾ hours; the remaining two flying-boats visited ports *en route*. The total distance covered by the Flight during the cruise was approximately 10,000 miles.

The flight of the Air Officers Commanding, Coastal Area, and the Special Reserve and Auxiliary Air Force, is also of considerable interest. They left Felixstowe air station on September 19 in a "Southampton" belonging to that station, and proceeded to Cattewater *en route* for Ireland. A crew of four was carried, making a total of six people, with baggage. The start was made in a strong head wind and heavy rain storms. The journey to Plymouth was successfully accomplished in 2½ hours, despite the severe nature of the weather.

On the 21st, the flying-boat left in a westerly gale and rain for Ireland. Off Lundy, really bad weather was experienced, and hardly any headway was made for about 20 mins. Carrickfergus (Belfast Lough) was, however, safely reached, the journey of 370 miles having been covered in 5½ hours.

After the demonstration at Belfast had taken place on the 22nd, the Air Vice-Marshal's boat, with the same passengers and crew, left for Cromarty against a strong northerly wind and rain. The weather was so bad that they were forced to land at Oban, the clouds being too low to allow of a crossing being made *via* the Caledonian Canal, which is flanked by high hills. On the following day, however, conditions had improved and the machine reached Cromarty after a flight along the canal. Here the A.O.C., Coastal Area, visited the Commander-in-Chief, Atlantic Fleet. On the 25th the flying-boat left for the Firth of Forth, so that the A.O.C. could inspect some of the Scottish units of the Coastal Area Command. After a total flight of 610 miles, Felixstowe was reached safely the same evening at 8 p.m., the pilot landing in the dark under extremely difficult circumstances. The total flying time taken from Cromarty to Felixstowe was slightly over 8 hours.

Both cruises have shown that under conditions of weather which must throughout be considered distinctly bad, the "Southampton" flying-boats are capable of keeping the air and carrying out such observations as visibility will permit. What is more important, it demonstrates that a programme once having been drawn up, it can be adhered to practically independently of the weather. Refuelling at sea was carried out on all occasions without a hitch, and, provided a certain amount of shelter is available when the flying-boats are not flying, it has been demonstrated that they can function successfully quite separately and independently of their land bases.



AN AMERICAN SCHNEIDER CUP DEFENDER : This photograph shows the Army-Curtiss racer on which Lieut. Cyrus Bettis of the U.S. Army Air Service won the Pulitzer race at a speed of 248·99 m.p.h. Similar machines, fitted with floats, will be used as defenders in the Schneider Cup seaplane race.

THE TREND OF AIRSHIP CONSTRUCTION IN ITALY*

By ENGINEER UMBERTO NOBILE

SIGNOR NOBILE, who is Director of the Italian Government Airship Construction Establishment, stated in his introductory remarks that the progress made during the last two years in Italy in the construction of semi-rigid airships was, in his opinion, of paramount importance and such as to warrant the submittal to the Brussels Congress of a briefly summarised account of the activities in that country. Such progress, in fact, was achieved by developing and gradually perfecting the N type, which was now quite characteristic of the Airship Construction Establishment in Rome.

While the N.1 (18,500 mm.) airship was still in course of construction, the author referred to this dirigible at the last London Congress, estimating a maximum speed of 100 k.p.h. (62 m.p.h.), a useful load of 10,850 kgs., and considering a lifting force of 1,150 grams per cubic meter.

This airship (*see* FLIGHT, March 20, 1924) was completed in 1923, and the test flights made on March 1, 1924, were so successful that not the slightest alteration in any structural element had to be made notwithstanding the fact of it being the first example of quite a new type of ship. In subsequent test flights made under stringent conditions, the dirigible proved to be extremely robust and to possess great stability, manœuvrability and high speed.

The own weight of the dirigible—in full flying efficiency but excluding equipment—was approximately 13,000 kgs., consequently there was a useful load of 8,275 kgs. instead of 10,850 kgs. as estimated, and a "coefficient of utilisation" (ratio between the useful load and the total lifting force) of 0·39 instead of 0·50 as estimated.

This rather big difference between the estimated and the actual figure was due to a number of circumstances, but principally to the following:

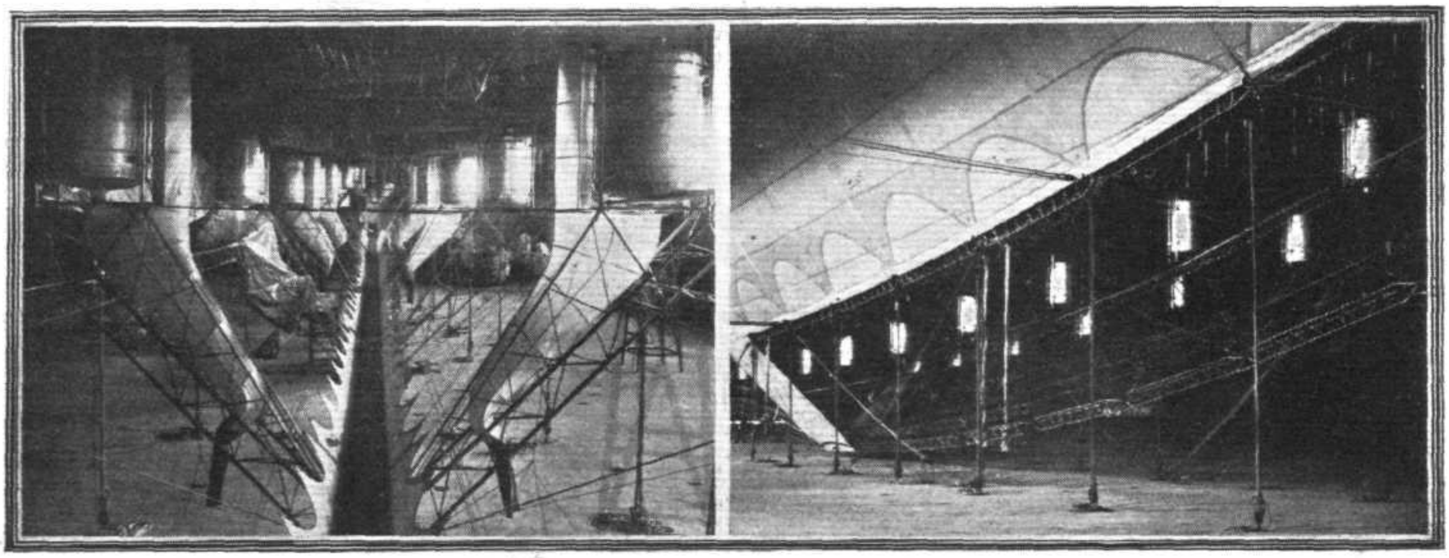
(*a*) Fabrics already in stock had to be used for making the envelope although much stronger and heavier than actually required.

(*b*) A cabin with the most up-to-date fitments and even a bed cabin were built to demonstrate the possibility of affording passengers a maximum of comfort.

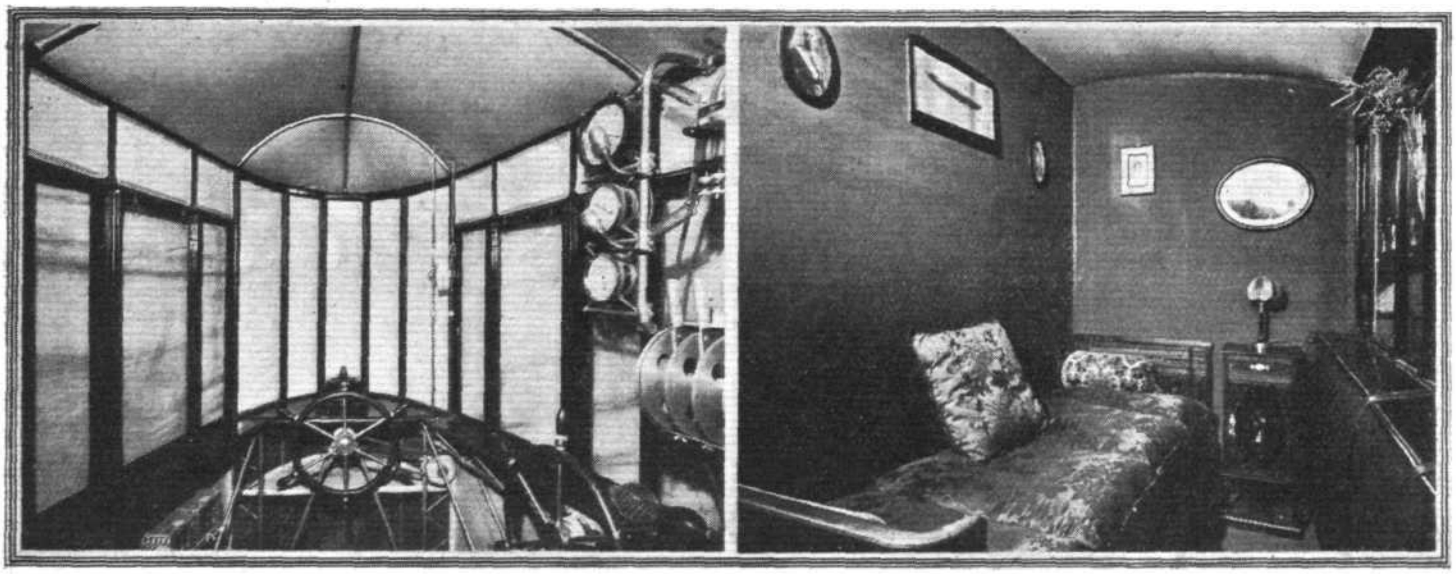
(*c*) The weight of certain accessories was exceeded, particularly in the covering of the framework and in the runway inside the hull extending from nose to tail.

On the other hand a much higher velocity than estimated was obtained, in that with a developed power of 750 h.p. an accurately checked speed of 70 m.p.h. was obtained, instead of 62 m.p.h., as estimated.

This result Sig. Nobile pointed out was of capital importance. In fact, by measuring the aggregate aerodynamical efficiency by the ratio between the product $V^{2/3} v^3$ (V, volume in cubic meters; v, speed in km./hour) and the motive power N (in h.p.) we got a value of 1,350,000, which was 40 per cent.

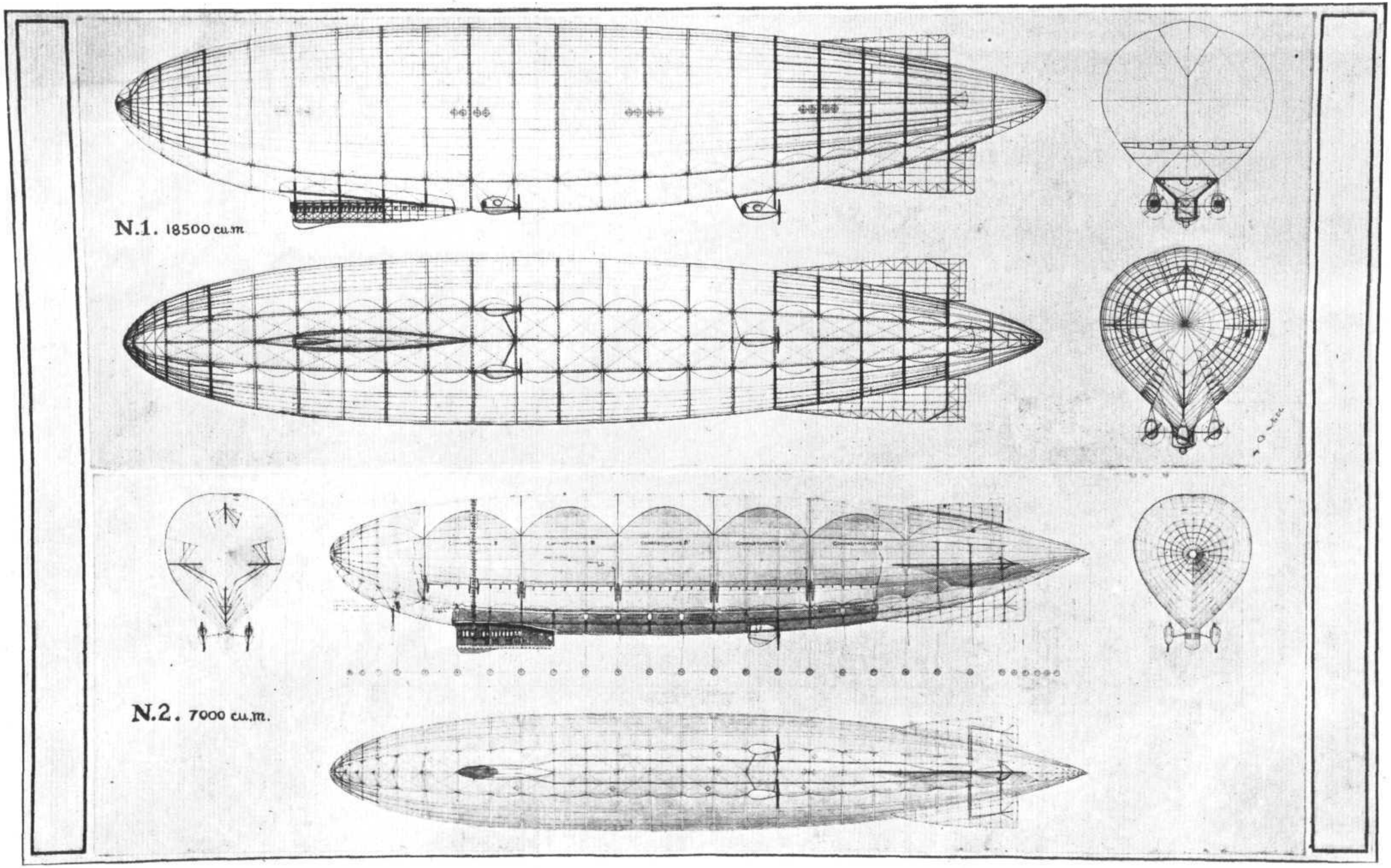


Two views of the ventral keel of the N.1 semi-rigid airship. Note the fuel and water-ballast tanks.



The Italian N.1 semi-rigid airship. On the left, the forward part of the control cabin, and, on the right, the luxuriously furnished bedroom—both situated in the front main car.

* Paper read at the Third International Air Congress, Brussels, Oct. 7, 1925.



THE TREND OF AIRSHIP CONSTRUCTION IN ITALY: General arrangement drawings of the N.1, 18,500 cub. m. and the N.2 7,000 cub. m., semi-rigid airships.

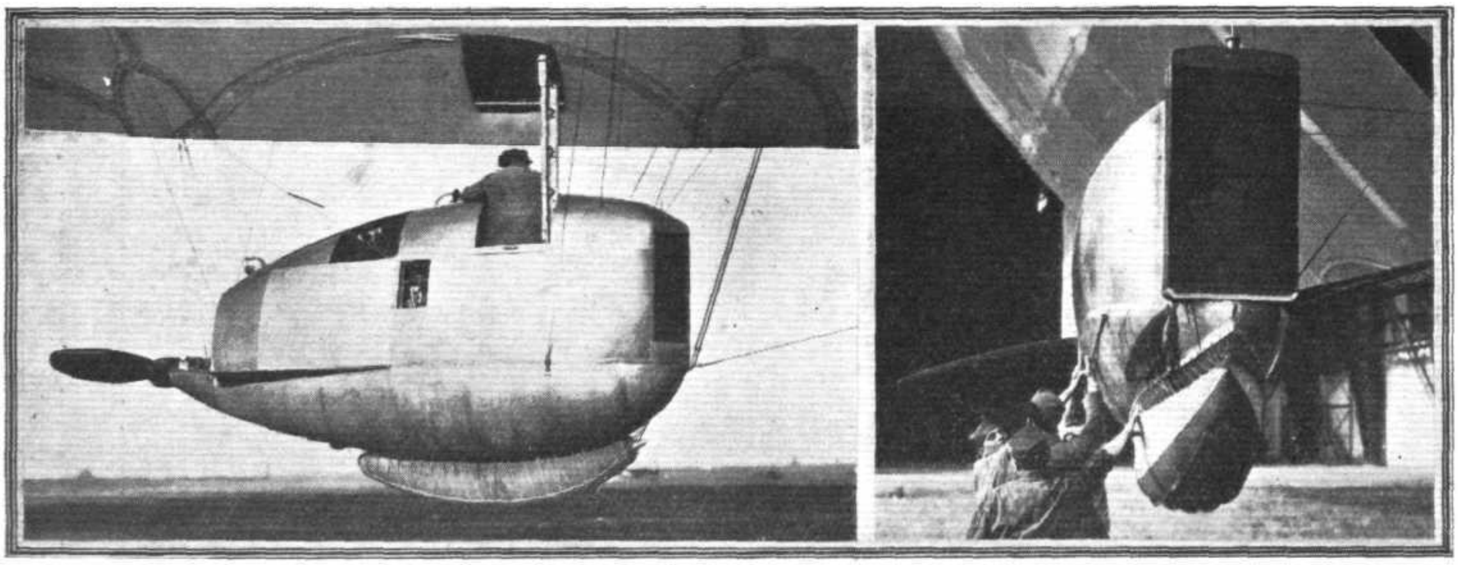
above the estimated figure communicated to the London Congress, and more than double the efficiency of all the other dirigibles of equal or greater volume built so far in Italy.

The decisive importance which this very considerable progress in aero-dynamical efficiency had as regards the future development of semi-rigid construction, was self-evident. For the same volume and velocity, double efficiency

The "Mr." 35,000 cub. ft. semi-rigid airship (the smallest in the world) making a descent on a lake. A small pneumatic boat, also shown, is carried on the airship.

spelt fuel economy to the extent of 50 per cent., and consequently a very much greater endurance of the airship itself. From this viewpoint, this Italian semi-rigid, N type, could now compete successfully with the most modern rigid airships.

The results obtained in the aerodynamic efficiency were such that one would not be surprised if, despite the diminution obtaining in the useful load, the *index of actual efficiency* of the dirigible defined as a value of the product of the coefficient of useful load of the aggregate aerodynamical efficiency and



Two views showing, on the left, the central engine nacelle of the N.1, and, on the right, the starboard engine nacelle of the N.2 semi-rigid airships.

of the velocity, proved to be *considerably higher than the estimated figure*.

In fact, we got:

$$\frac{V^{2/3}v^3}{N} = 0 \cdot 39 \times 1,350,000 \times 113 = 10^6 \times 59 \cdot 5,$$

whereas in the communication to the London Congress a value of $10^6 \times 47 \cdot 1$ had been estimated.

The "N.1" dirigible (18,500 cubic metres) mentioned above, apart from its characteristic constructive simplicity, presented a complex of structure which was at once extremely robust and compact, with the exception, however, of the stern, where the support of the empennage, as designed and constructed (a system of steel tube rings located along the parallels of the envelope, attached on the bottom of the central framework of the dirigible, and joined together by means of another system of tubes located along the parallels) presented not only considerable difficulty as regards assembling, but it was also not sufficiently independent of the deformations of the envelope. Furthermore, the complexity of the superficial stiffening and of the fins which were connected to the former by means of hinges and bracing cables, constituted a hyperstatic system which was of difficult and uncertain calculation.

To obviate these disadvantages Sig. Nobile studied in 1924 a new tail surface supporting system. It consisted of extending the ventral framing of the hull as far as the meridians along which the horizontal fins and relative mobile parts forming the elevators must be located. The fins were thus joined on one side to the internal framing along the ribs corresponding to the meridians of the envelope, whereas externally they were supported by shaped elements of good penetration, starting from the bottom of the said framing,

In this manner the dynamic stresses of the horizontal surfaces were referred to the supporting framework of the hull by means of structures statically determined and easy of calculation. Consequently, a very simple and light structure was obtained, infinitely more compact than the system of superficial stiffening.

Naturally, when drawing a comparison between the two systems one had to bear in mind that with the system of internal stiffening a certain volume of gas was lost; but, on the other hand, as far as the stern was concerned, we got a better utilisation of lift.

In the new system, as in the old, the lower vertical fin and relative rudder were directly and rigidly joined to the ventral framing, whereas the upper fin, if any, was merely supported by the envelope to which it was suitably braced by means of steel cables.

Having designed the new structure of the tail end, Sig. Nobile said he did not deem it expedient, for obvious reasons, to apply it to dirigibles of medium or large volume without first experimenting with it, and so he decided to test it out on the "Mr.," a miniature airship of only 1,014 cubic metres (35,000 cubic ft.). The experiment was highly successful.

The peculiarity of this little dirigible was not so much that it was the smallest semi-rigid in the world, but that it was the *most rigid* of all the others built up to the present. In fact, the triangular beam of steel tubing forming the keel from prow to stern consisted of elements which were rabbeted instead of articulated with spherical knuckle joints, as was the case with all previous construction. Spherical knuckles existed only in two transversal sections, in order to facilitate assembling, disassembling and transportation of the keel itself.

Here Sig. Nobile briefly described this small airship, but as full particulars of the "Mr." were published in FLIGHT for September 4, 1924, we need hardly repeat them here. He stated, however, that in a great number of cases the "Mr." had been flown single-handed; its navigating qualities were really remarkable, and it possessed great stability and exceptional manœuvrability—so much so that a number of successful landings had been made in a courtyard in the heart of the city of Rome. It had already made over 160 flights, crossing the Appennine mountains several times.

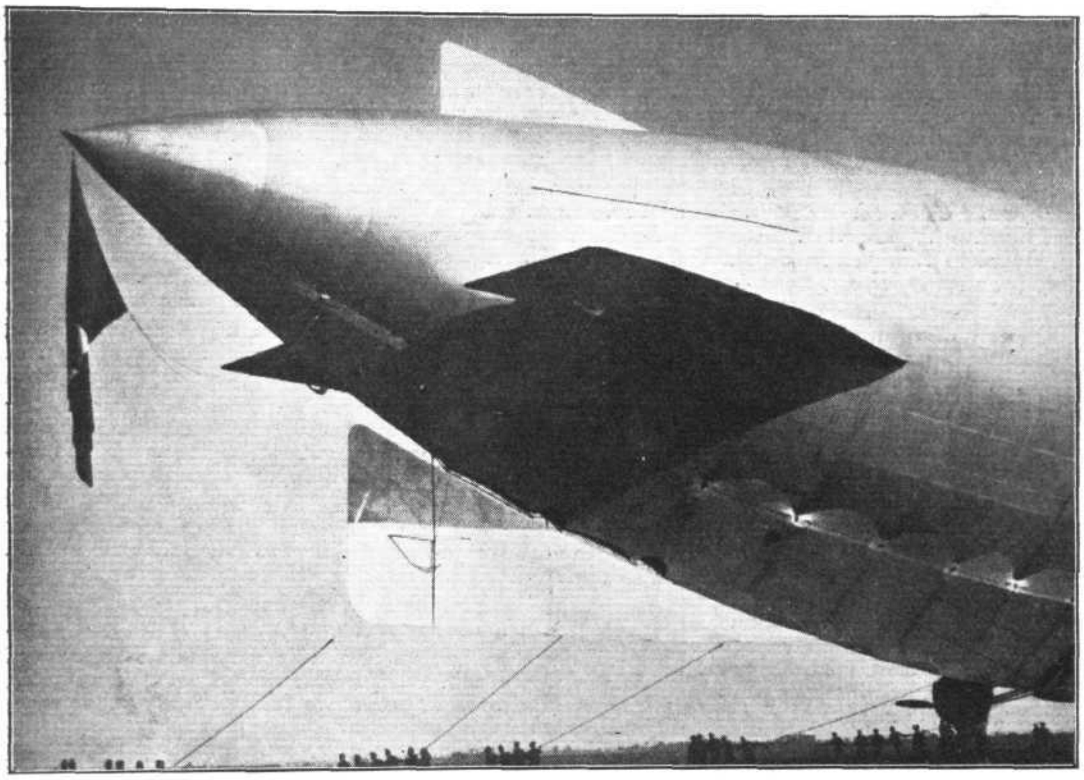
Continuing, Sig. Nobile said it was of importance to note that, on the other hand, the rigidity and robustness of the nose piece, and on the other hand the compactness of the tail surfaces, and the fact of their being independent of envelope deformation, were factors which relieved the pilot from all preoccupation as regards controlling the internal pressure—it being possible to fly for long periods without any trouble, even in the case of strong depression in the envelope.

What was really remarkable, he added, and gave a patent demonstration of the high degree of perfection reached in Italy in the technique of semi-rigid construction, was that they obtained a useful load which, proportionately to the small dimensions of the airship, was undeniably very high. In fact, in its own weight, notwithstanding the adoption of a rigid framing from prow to stern, was only 650 kg. (1,430 lbs.) and, consequently, the useful load was 516 kg. (1,135 lbs.). Thus, the coefficient of useful load was 51 per cent.

From some characteristics of the "Mr." given—Volume (V) = 1,014 cub. m., speed (v) = 72 k.p.h., h.p. (N) = 40—Sig. Nobile gave the value for aerodynamic efficiency as $\frac{V^{2/3}v^3}{N} = 935{,}000$, which was very high considering the volume: for the index of actual efficiency:—$0 \cdot 51 \times 935{,}000 \times 72 = 10^6 \times 34 \cdot 3$.

To give an idea of the progress achieved, Sig. Nobile compared these values with those of the "S.C.A." dirigible, 1,500 cub. m. (53,500 cub. ft.), built in 1921, and which at that time was considered a great advance.

	"SCA" airship	"Mr." airship
Coefficient of useful load ..	0·29	0·51
Aerodynamic efficiency ..	870,000	935,000
Index of actual efficiency ..	$10^6 \times 20 \cdot 7$	$10^6 \times 34 \cdot 3$



The stern of the N.2 semi-rigid airship, showing the modified system of tail surfaces.

and this, nothwithstanding the inexorable law by which, on the volume decreasing, the percentage of useful load decreased more and more in proportion.

In view of the satisfactory results obtained with the "Mr" dirigible, the new supporting system of the tail surfaces was fitted to a dirigible of larger volume—the N.27,000 cub. m., which was built last winter, and made its first flights last July, with considerable success.

With the exception of the tail-stiffening, its general structure was substantially the same as that of the N.1 type (18,500 cub. m.). The *profile* adopted for the hull was similar to that of the N.1, with the exception of a slight modification at the stern which, in this case, was conical instead of roundish. Furthermore, after the project had been completed, it was decided to somewhat increase the volume, and to simplify matters, a cylindrical trunk was inserted in correspondence with the main section, so that the elongation was slightly greater than that of the N.1.

The author here gave some constructional details of the N.2, and again we would refer our readers to a description of this airship which was published in FLIGHT for September 10 last. From a specification of the N.2, given—from which we quote the following:—Volume (V) = 7,100 cub. m.; speed (v) = 110 k.p.h.; h.p. (N) = 470—with a coefficient of useful load of 42·5 per cent., for the aerodyanmic efficiency $\frac{V^{2/3}v^3}{N}$ a value of $\frac{366 \times 1{,}331{,}000}{470} = 1{,}035{,}000$, was obtained, and for the index of actual efficiency, a value of $0 \cdot 425 \times 1{,}035{,}000 \times 110 = 10^6 \times 48 \cdot 5$.

A useful load coefficient of 42·5 per cent. might be considered satisfactory, considering the limited volume, the high velocity, and the great space available inside the framing, giving comfort and roominess in the control cabin, and the easy access to all vital parts of the dirigible. On the other hand, the aerodynamic efficiency proved to be somewhat less than that of the N.1 (18,500 cub. m.) ship. This was due mainly to the fact that on diminishing the main section it was impossible to decrease the main section of the control cabin, of the engine nacelles, and of a number of accessories in the same proportion. Furthermore, the profile of the N.2 was perhaps not so good as that of the N.1.

Where dimensions and velocity were concerned, the N.2 could usefully be compared with the "P.M." airship (5,270 cub. m.), which had a useful load of 2,150 k.g. and developed a speed of 94·4 km. at 380 h.p. (see Minutes of the London Congress). This ship was built in 1922 and was still in service.

Consequently we get:

	N. 7,000 cub.m.	P.M. 5,270 cub. m.
Coefficient of useful load ..	42·5 per cent.	35·5 per cent.
Aerodynamic efficiency ..	1,035,000	670,000
Index of actual efficiency	$10^6 \times 46·5$	$10^6 \times 22·4$

One could notice at once the enormous progress made, without taking into account the fact that the "P.M." (the keel of which was of the old type, flat framing, and with one cable-suspended nacelle), unlike the N.2, did not offer the possibility of access to the most vital parts of the structure, nor of varying the distribution of the loads along the framing in relation to the exigencies of navigation, neither did it possess, like the N.2, a spacious control cabin with all the most up-to-date fitments.

RADIAL AIR-COOLED AERO ENGINES

By ROY FEDDEN

"After some years of experimental work the success of this engine is now an accomplished fact, and its performance as regards reliability, life, and fuel consumption, is such that it must be reckoned with the best water-cooled engines of today."

This statement was made by Mr. Roy Fedden, the designer of the famous Bristol aero engines, in a paper read by him before the International Air Congress at Brussels.

In the first part of his paper Mr. Fedden outlined briefly the early history of the static air-cooled radial engine recalling that when, in 1917, it was found that the limit of the air-cooled rotary had been reached, attention was drawn to the static air-cooled radial of 300 to 400 h.p. Although an excellent power-weight ratio was obtained, the promise given by these engines was not fulfilled. Serious failures occurred and designers of aircraft were disappointed and held up indefinitely for their power units. Following these failures the air-cooled radial went through a bad period, but in spite of this there were still people who believed that the radial air-cooled had great possibilities providing proper time and care were given to its special problems.

Mr. Fedden said that although it was not suggested that the radial was unequalled for all types of aircraft, nor denied that the successful development of this type of engine had been a long and serious undertaking, yet he confidently believed that the type would hold its own against all comers for certain classes of military and naval work, at any rate, for the next ten years. He pointed out that a 440 h.p. production engine of the static air-cooled radial type weighed, complete with propeller hub, exhaust manifolds, air intakes, etc., 33 per cent. less than that of the very best water-cooled engines with the same equipment, plus radiator and water.

Advantages of the radial air-cooled engine.

Mr. Fedden then proceeded to indicate certain distinct advantages which the static air-cooled radial was claimed to possess as compared with the accepted types of "in line" and "Vee" type water-cooled engines. Of great importance among these was the saving of weight. On this score the author expressed the opinion that up to 1,000 h.p. the static air-cooled radial offered by far the most promising field of exploration. Reference was made to some interesting tests made with air-cooled radials on commercial service during the last twelve months and it was stated that the radial had given extremely satisfactory results allowing a 15 per cent. increase in the paying load, combined with a 7 per cent. increase in the speed, and the improvement up to 50 per cent. increase in the take off and climb, these advantages being accompanied by a 10 per cent. reduction in the fuel consumption per hour.

Another advantage claimed for the static air-cooled radial was the practical elimination of inertia torque. It was pointed out that if gearing was desired a reduction gear could readily be incorporated while maintaining the central axis for the propeller shaft. By employing air-cooling one dispensed with the radiator, piping and water, with their attendant troubles, and for military and naval purposes the elimination of all water was important since in certain districts water might be very difficult to obtain. On certain classes of machine it might be necessary to leave the ground or take off a ship within a few seconds of starting the engine and it was claimed that the air-cooled engine had great advantages in this respect.

For use in very warm climates it had been found that an air-cooled cylinder would maintain full power if the mean temperature of the fin did not exceed 175°C. By way of comparison Mr. Fedden stated that if the mean temperature of the cooling surfaces of a radiator exceed 80°C., evaporation losses became considerable. In hot climates where the temperature might vary from 0°C to 45°C., the temperature difference available for cooling might diminish 56 per cent. in the case of the radiator, whilst this diminution was only 25 per cent. in the case of the air-cooled cylinder. In very cold climates also, the lectuier stated that the air-cooled engine was still more at an advantage.

From the point of view of manœuvrability and saving of space, the static air-cooled radial scored by being the shortest and most compact power unit it had been possible to develop so far. From a manufacturing point of view Mr. Fedden claimed that the radial scored through nearly all its parts being symmetrical or round so that a considerable proportion of the machining was in the form of multiples, and apart from actual manufacturing facilities it was possible with a single-row static radial to eliminate castings altogether. In actual use the radial could be dismantled, overhauled and re-assembled much more quickly than any other type of engine with the exception of the rotary. The lecturer stated that it was possible for two men completely to strip down ready for inspection a 440 h.p. radial air-cooled in 8 hours, and to rebuild it in 15 hours.

Problems of the radial.

Having indicated the main advantages claimed for the radial air-cooled aero engine, Mr. Fedden dealt with some of the special problems peculiar to this type of engine, and which had been responsible for failure in the past. The main difficulties had been insufficient cooling; valve burning, wear and failure of valve mechanism: excessive fuel and oil consumption; unreliability and break down of big end bearing assembly; crankshaft failure; faulty installation. Mr. Fedden stated that these problems had been successfully dealt with by much careful experimental work, and one by one the troubles had been weeded out, until now the air-cooled radial was able to take a prominent position.

With regard to cooling, Mr. Fedden stated that cylinders had now been evolved with a cooling area of not less than 25 sq. ft. per brake horse-power, and 0·3 in. pitch of fins, which would maintain an indicated main effective pressure of 142 for certainly 250 hours without breakdown or overhaul. Valve and valve mechanism difficulties had been overcome, firstly, by the great strides recently made in valve material, chromium alloys, combining cobalt silicon, and high percentages of nickel, having been of great assistance in eliminating scaling and warping. The question of valve clearances was one of the utmost importance on radial engines and the trouble arising from the cylinders "growing" had been countered by incorporating a patent mechanism whereby the valve automatically maintained the clearance set when the engine was cold.

Both the petrol and oil consumption of air-cooled radials had been excessive in the past, but through the elimination of hot spots and the maintenance of more even temperatures, and by careful investigation of the problems of induction systems and distribution, it had been possible very greatly to improve the petrol consumption. The oil consumption had been greatly reduced by the correct design of the crankcase to drain away the oil and by use of efficient scraper rings.

The big end bearing assembly required very careful design

and early types failed mainly on account of the high loadings, heavy moving parts, lack of stiffness and unsuitable lubrication. The lecturer considered that the plain bearing offered the best solution as it was lighter and the rubbing speed could more easily be kept down, while the articulated rod pin centres could be kept nearer the centre of the crankpin. By careful design it was possible to obtain a big end construction with a mean load factor of 10,000 lb. per sq. in., which would give an excellent life.

In single row radial engines a desire on the part of designers to incorporate a nose which might be suitably cowled in had led to prolongation of the propeller end of the crankshaft. It was essential that the propeller shaft end should be as short as possible.

Although the lecturer did not wish to make any excuses for the delinquencies of the static air-cooled in the past, he submitted that many of the earlier radial engines were seriously hampered by incorrect installation. It was not sufficient so to mount an engine that an ample volume of air from the slipstream of the propeller impinged on the cylinder heads, if this air was not able to get away. To obtain the best results from an air-cooled engine the whole installation required to be approached from a new standpoint. An interesting type of cowling for single row radial air-cooled engines had recently been tested in England and France with very promising results, and this scheme, which was not new, and was originally put forward by Mr. Robert Bruce, of the Westland Aircraft Company, some years ago, consisted of cowling the engine down to the crankcase and fitting over the cylinders separate helmet cowls which could be supplied with controllable shutters and individual silencers.

On the question of super-charging the lecturer stated that the exhaust driven turbo-compressor was most promising, and the difficulties of super-charging air-cooled radials had not materialised. Mr. Fedden also referred to the Bristol variable valve timing gear, which affords a simple method of increasing performance at a height in cases where the extra complication of a supercharger is not warranted.

In conclusion, Mr. Fedden stated that for some years to come the radial would have no serious competitor and would stand for the following types of machines :—

1. For light aeroplanes with engines of one to three litres.
2. For training machines, taxi-planes, and the smaller passenger machines, with three, five or seven cylinders of six to nine litres capacity.
3. For single-seater and two-seater fighting machines of all classes.
4. For deck-landing machines, and the smaller float type seaplanes.
5. For the smaller type single engine, and the large multi-engine commercial machines.
6. Generally for machines in extremely hot and cold climates.

PREVENTION OF ACCIDENTS IN COMMERCIAL AVIATION

By F. HANDLEY PAGE

"To diagnose the causes of accidents is the first stage towards their prevention, and in the following paper an investigation is made into the various accidents which have been recorded in the British Civil Aviation Reports, with a view to indicating the way in which such accidents may be avoided."

This statement was made by Mr. F. Handley Page in a paper which he read last week at the International Air Congress at Brussels. The lecturer, for the purposes of his paper, divided the causes of accidents to commercial aircraft into two categories—(1) those due to the aircraft, and (2) those due to the conditions under which the aircraft operated. One must, Mr. Handley Page said, deal with the question in a broader spirit, and consider as accidents, unsuccessful flights whereby the journey was interrupted. Unsuccessful flights were those which were interrupted by involuntary or forced landings, but which did not, necessarily, result in any accident. The comparative freedom of British civil aviation from accidents was very largely attributable to the high skill of the pilots in the many cases of interrupted flights that had occurred. It was interesting to recall that no accidents had resulted at terminal aerodromes, so that one might consider that a normal landing in a terminal aerodrome was not an operation attended by risk, or calling for a very high degree of skill.

Examining the unsuccessful or interrupted flights due to the aircraft, these were classified under the following heads: (1) failure of the engine or engine installation, and (2) failure or partial failure of part of the structure of the aircraft, or of its control. Tables were shown which gave the numbers and causes of landings from July, 1922, to March, 1925. From these tables it was seen that during 1922–23 23 per cent. of the landings were due to engine or installation failure. In 1923–24 the figure rose to 26 per cent., and in 1924–25 to 34 per cent., the actual figures for engine failures being 47 in 1922–23; 91 in 1923–24; and 96 in 1924–25. The lecturer pointed out that in the summer period, when the most flying was done, the percentage of engine failures to total failures was the highest, but this was not a good method of comparison as in the winter there were many more weather interruptions.

A better basis for comparison was to consider the interruptions due to engine or installation failures as a percentage of the total flights commenced. The figures were 2·25 per cent., 2·26 per cent., and 2·2 per cent. respectively.

Engine failures proved to be far the greatest cause for interruption of flights, and on an average they caused more than twice the number of involuntary landings due to other causes.

It was, the lecturer said, somewhat startling to consider that on the basis of the past few years' working, practically one flight in every 45 was interrupted owing to engine or installation failure. This indicated that there must be a very great improvement in the power plant and its installation if a scheduled service was to be run over a long distance. A railway service with 2 per cent. of its trips interrupted due to engine failure would be impossible. It should be remembered that each engine or installation failure might result in a forced landing in the case of a multi-engined machine, and almost certainly would result in a forced landing in the case of a single-engined machine, and, however skilful the pilot might be, both the machine and its occupants might be seriously jeopardised in a forced descent.

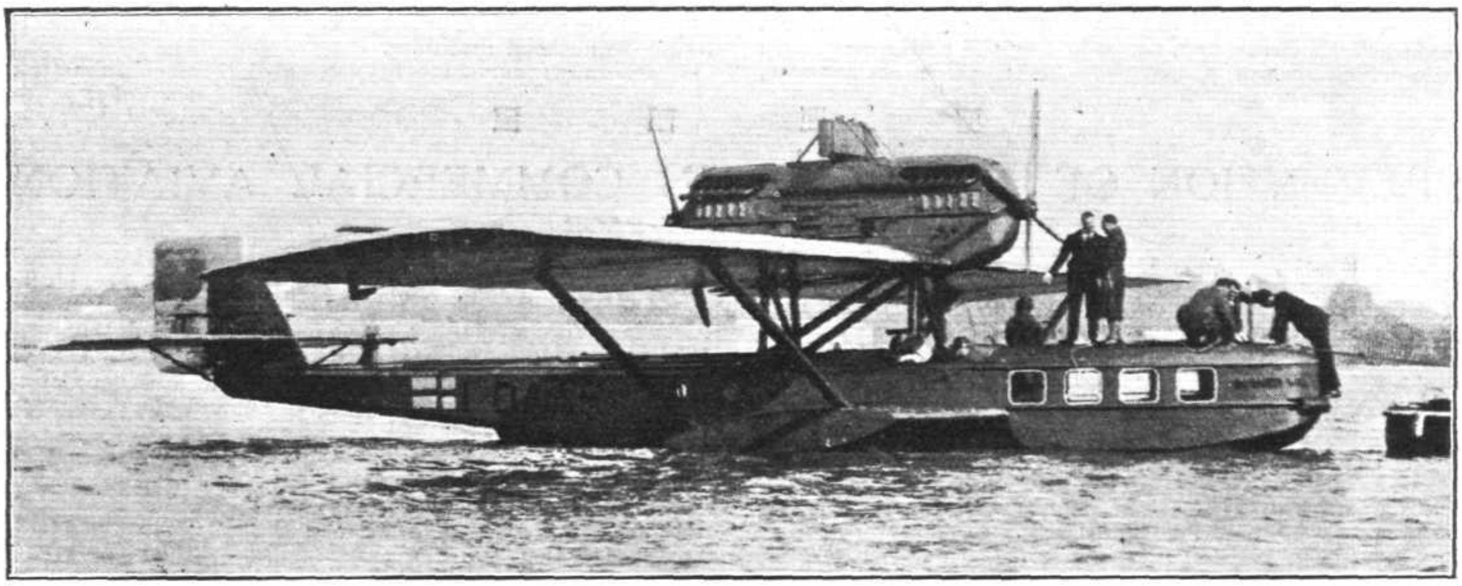
Turning to the involuntary landings due to conditions under which commercial aircraft operated, Mr. Handley Page stated that although the number of involuntary landings due to other reasons seemed high, it comprised a very wide scope, and those due to failure or partial failure of the structure of the aircraft, were happily conspicuous by their absence.

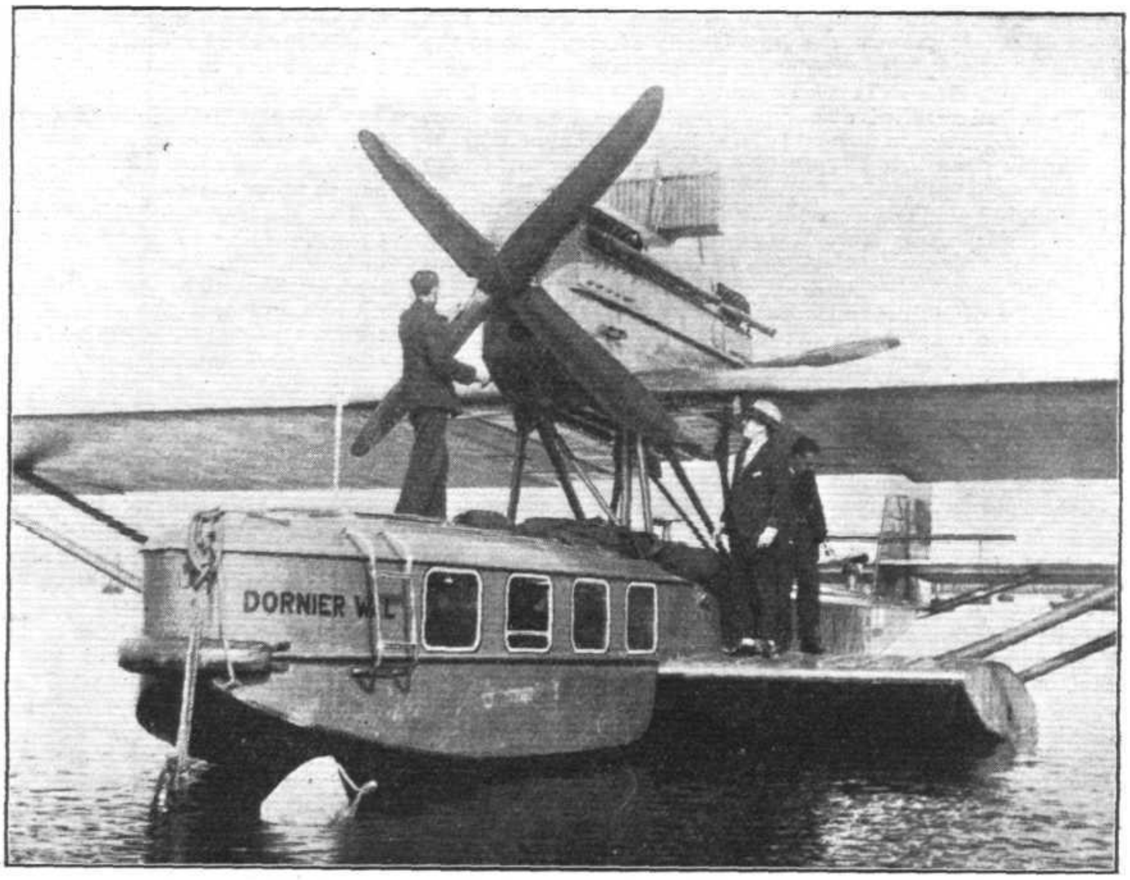
A table of statistics relating to the number of accidents that had happened on the British subsidised air services was shown, and the lecturer quoted the details of the accidents from the Report of the Director of Civil Aviation. Out of the five accidents which had happened during 1923–24, two were due to bad weather, while one might be due either to bad weather conditions whilst taking off, or to bad piloting. For the period 1924–25 there were four accidents, of which two were due to an error of judgment on the part of the pilot, one was due to a defect in the engine installation and one to other causes.

The lecturer pointed out that it was interesting to note that according to the time tables there had been a steady diminution in the number of flights interrupted due to adverse conditions during the summer months, the figures dropping from 3·75 per cent. in 1923, to 1·26 per cent. in 1924. The figures for the winter months did not show such comparative improvement, being for the three years 9·95 per cent., 10·2 per cent. and 7·25 per cent., respectively. From these figures one could realise the impossibility of running a real commercial service during the winter months when, on an average, 7½ and 10 per cent. of the flights commenced were interrupted, due to weather causing an involuntary landing. It would be seen that these formed a much larger percentage than those due to any other sources, being 6·7 per cent., 5·3 per cent. and 3·32 per cent. for the three years, compared with 2·2 per cent. of engine failures due to aircraft. The main causes of these weather interruptions were lack of visibility, due to fog, or low clouds, very heavy rain, hail or snow storms, and the presence of very strong head winds, causing the pilot to run short of petrol, and thus preventing the machine arriving at the terminal aerodrome before darkness set in. From these the lecturer concluded that the weather presented the greatest problem with which they had to deal in aviation. The number of accidents due to weather conditions must be seriously diminished if real progress was to be made, and this diminution had to hold good, even when a more extensive and regular service was attempted during the winter months. No pilot would attempt flying under adverse weather conditions unless he had confidence in the ability of the machine to carry him through

to his destination, and the lecturer arrived at the conclusion that over long distance services, under European conditions, multi-engined machines were a necessity.

Mr. Handley Page then, again referring to the tables, pointed out that up to March, 1923, 10 per cent. of the flights commenced were interrupted, 9 per cent. up to March, 1924, and 7 per cent. up to March, 1925, and during the last two years there were five and four accidents, respectively, which led to serious damage to the machine or injury to the occupants. This represented one serious accident for every 70 forced landings, or, approximately, one serious accident for every 1,000 flights commenced, which he regarded as much too high a percentage. Whilst the development of ground organisation and multi-engined aircraft was proceeding, Mr. Handley Page thought insistence should be laid on slow flying speeds with adequate control on all commercial aircraft. In the majority of cases, accidents were the result of a stall, and the lack of control which resulted, and if the aircraft could not only be landed slowly, but also flown slowly, the commercial air services could maintain a much greater degree of regularity. Another means of preventing accidents, as a result of having to make forced landings, was for the installation in the machine of a warning device to indicate to the pilot that the stalling point was being reached, or the use of the slot inter-connected with the aileron, or the slotted wing itself, so that full control was obtained if the machine was stalled, or, alternatively, that the stalling point was difficult to reach owing to the extremely great angle of incidence at which it occurred: No matter how adequate the control beyond the stall, it was much better to fly under the normal regime, but the slot and inter-connected aileron or slotted wing by itself provided the means by which the danger of a stall was avoided. A further point upon which Mr. Handley Page thought insistence should be laid was the avoidance of wing sections having a sudden stalling point.





These two views of the Dornier "Wal," which visited Southampton recently, have been sent to us by Mr. O. E. Simmonds. The upper photograph shows the machine at rest on the sea, while on the right is a view of the nose and the two Rolls-Royce "Eagle" engines.

JAPANESE AIRMEN REACH LONDON

With the usual English fog to greet them—and, incidentally, to upset pre-arranged plans—the four Japanese airmen, Maj. Abe, Mr. Kawachi, and their mechanicians Shinowara and Katagiri, arrived in England on October 12. Their last stage from Paris to London (perhaps the most flown route in the world) entailed about as much difficulty as any throughout their long journey from Japan.

They left Le Bourget shortly before noon, and although new engines had been fitted in both machines it appears that trouble developed on reaching the French coast. A descent was, at any rate, made at St. Inglevert at 1.45 p.m. and the engines were given an overhaul. In the meanwhile about 2,000 people had gathered at Croydon to welcome them, including a large number of the Japanese colony in London, and many representatives of the Air Ministry and British aviation industry. Among those present were Mr. Yoshida, Japanese Chargé d'Affaires; Maj.-Gen. Ninomiyea; Marquis Komatsu; Sir Sefton Brancker—who arrived by air from Brussels and who received a very hearty welcome back to England—Col. Edwards and Col. Shelmerdine, representing the Air Ministry for Civil Aviation; Air Vice-Marshal Sir Geoffrey Salmond, representing the Air Council; while the R.A.F. was represented by Air Commodore S. R. Sanson and a flight of Grebes from Kenley. The Royal Aero Club was represented by Col. F. K. McClean and Commander H. Perrin; the Society of British Aircraft Constructors was represented by Capt. Acland, while Mr. F. I. Bennett and Flight-Lieut. Bulman, on behalf of the Hawker Engineering Co., Ltd., and many other well-known aviation "fans" waited patiently to give our Eastern friends a real British welcome. It was, therefore, a thousand pities that this representative gathering waited in vain for our visitors, and had to leave, well after dusk, with their welcome ungiven when news eventually came in to the effect that the Japanese airmen had lost their way but had landed safely at Farnborough.

But, to proceed with the actual happenings of the flight. After a long delay at St. Inglevert, the two Breguets were ready to start, and at 4.15 p.m.—in spite of the advice of the "C.A.T.O." Croydon, that it would be wise to postpone the flight owing to weather conditions—the Japanese airmen set out once again for England, as they were most anxious not to disappoint those awaiting them at Croydon. It was very foggy when they crossed the English coast east of Dover; then, skirting the south of London, they endeavoured to make for Croydon, having to steer by compass as it was impossible to pick out any landmarks in the fog and gathering darkness. They were soon completely lost, and eventually decided to land. Mr. Kawachi came down in a small field, and in landing had the misfortune to bring his machine on to its nose—fortunately, however, with little, if any, damage to the machine and with only slight injury to Mr. Katagiri. Maj. Abe flew a little farther on, and, spotting a somewhat better "field," made a perfect landing, in semi-darkness, and found to his dismay that he had alighted on Farnborough Aerodrome. He was welcomed by members of the R.A.F. at Farnborough and by Capt. F. T. Courtney (who had been testing the Spanish "helicopter" machine), and they at once went to the assistance of Mr. Kawachi, the Japanese airmen being later entertained at the R.A.F. mess at the aerodrome. Capt. Courtney then motored them up to London, thus enabling them to attend a reception at the residence of the Japanese Ambassador. The flight, which has been organised by the *Asahi* newspaper, began at Tokyo on July 26; Harbin (Manchuria) was reached on August 2, Moscow on August 25, Berlin on September 17, and Paris on September 28.

On Tuesday, October 13, the Royal Aero Club and the Society of British Aircraft Constructors gave a luncheon in honour of the Japanese aviators Captain Abe and Mr. K. Kawachi at the Savoy Hotel. His Grace the Duke of Sutherland, Chairman of the Royal Aero Club, was in the chair, and after the loyal toasts to H.M. the King and H.I.M. the Emperor of Japan, proposed the toast of the Guests His Grace gave a brief outline of the manner in which the flight from Tokyo to London came to be planned, referring to the fact that most of the funds had been placed at the disposal of the aviators by the Japanese newspaper *Asahi*, which was thus doing excellent propaganda work for aviation, much as had the British press. He stated that everywhere the Japanese aviators had been fêted, and in Moscow they had, he understood, received very high decorations. Their main troubles had been due to weather, and they were held up in Moscow, although whether by weather or in connection with the decorations he did not know. Great credit was due not only to the two pilots, but also to their mechanics, who had seen to it that the engines and machines were given every care. The Duke of Sutherland pointed out that this was the first time the northern route had been followed, and thus the flight could be regarded as a pioneer one.

While they were gathered to celebrate a sporting event of this nature, the Duke of Sutherland said they should not forget another sporting event that was shortly to take place, and he would suggest that a telegram be sent to the British Schneider Cup Team in America wishing them luck in the forthcoming seaplane race.

Sir Phillip Sassoon, Under-Secretary of State for Air, who seconded the toast, referred to the visit as being in the nature of a return one for the visit of a famous French aviator to Japan, but said they were all glad that the Japanese aviators had decided also to visit this country. He looked forward to the day when such visits, instead of as now being sporting ventures, were usual occurrences.

Capt. P. D. Acland read a telegram from Mr. T. O. M. Sopwith, C.B.E., Chairman of the S.B.A.C., regretting inability to be present and congratulating the Japanese aviators on their magnificent flight. He (Capt. Acland) associated himself with what had been said, and also pointed out that it was due to the Japanese press that the flight had been possible, just as in this country it was due to the press that we had been able to achieve what we had in aviation. Without the assistance of the press our technical and scientific brains would not have been able to do what they had done. He also spoke of the excellent work of the mechanics, less spectacular but at least as important as that of the pilots. He referred with gratitude to the kindness and hospitality shown British representatives in Japan, and expressed the hope that during their stay in this country the Japanese aviators would visit R.A.F. stations and penetrate to the works of private constructors. He was sure that we should be able to astonish them with the excellence and performance of British aircraft and aero engines and by the beauty of British workmanship.

Captain Abe and Mr. Kawachi both spoke in Japanese, their remarks being afterwards translated. They expressed gratitude for the kindness shown them in this country and Capt. Abe acknowledged Japan's debt to British aeronautic science.

Among those present were:—The Duke of Sutherland, Sir Philip Sassoon, Lieut.-Col. F. K. McClean, Capt. H. E. P. D. Acland, J. Yoshida (Japanese Charge d'Affaires), Major-General H. Ninomiya, Air Commodore A. M. Longmore, Air Vice-Marshal Sir Sefton Brancker, F. Handley Page, Major S. V. Sippe, C. G. H. Winter, Capt. D. Nicolson, F. Sigrist, Basil Johnson, H. H. Morris, H. G. ffiske, Squadron Leader M. E. A. Wright, H. Burroughes, Squad-Commander James Bird, G. G. Parnall, R. Delpech, C. C. Walker, C. V. Allen, H. E. Perrin.

On Wednesday, October 14, Vickers, Ltd., gave a luncheon to the Japanese aviators at the Hotel Cecil, Mr. Douglas Vickers being in the chair. A distinguished company had gathered to honour the Japanese guests, and it was pointed out by the Chairman that probably the gathering was unique in the number of heroes of long-distance flights present. These included, in addition to the Japanese guests, Sir Arthur Whitten Brown, who was the late Sir John Alcock's navigator on the Cross-Atlantic flight, Squadron Leader Sir Quintin Brand, of England-Cape Town flight fame,; Captain S. Cockerell, who flew from England to S. Africa in 1920; Major D. Aracena, who made a flight from Santiago to Rio de Janeiro in 1922. Flight-Lieut. Plenderleith who was Squadron Leader MacLaren's pilot on the flight from England to the Behring Sea last year, and Major-General Sir Sefton Brancker, Director of Civil Aviation, who this year flew with Alan J. Cobham to Rangoon and back, and who has but recently returned to England from another tour to the East, on which he added another 4,000 miles or so to his already long list of flights.

Speechmaking was reduced to a minimum, but the following made a few brief remarks: Mr. Douglas Vickers, Captain Abe, Mr. Kawachi (the two last-named speaking in Japanese), Sir Sefton Brancker and Commander Sir Trevor Dawson.

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Two New Light 'Plane Clubs

It is reported that two new, unsubsidised, light 'plane clubs have been formed—one the Southern Club, with headquarters at Shoreham, and the Seven Club (so called because it has only seven members) with Lord Edward Grosvenor as its chairman at Eastchurch.

Personals

Married

On September 19, 1925, at All Saints' Church, Leamington Spa, ALFRED WILLIAM CLEMSON, R.A.F., son of J. Clemson, Esq., Wellington, Shropshire, was married to EILEEN EDITH, daughter of Mr. and Mrs. ARTHUR R. HANDS, Johannesburg, Transvaal.

Flying Officer ALEXANDER THOMAS LAING, R.A.F., was married on September 26, at the Church-in-the-Wood, Hollington, Sussex, to EILEEN MARY, youngest daughter of Mr. and Mrs. F. W. UPSON, of Hollington Park, St. Leonards-on-Sea.

CHARLES TEVERILL FREEMAN, D.S.C., A.F.C., (late Major, R.A.F.), only son of Mr. and Mrs. P. B. Freeman, of Southgate, was married on October 3, at St. Mary the Virgin and All Saints', Potters Bar, to MARGARET LEONORA, second daughter of Mr. and Mrs. J. J. E. WATSON, of Potters Bar.

Flight-Lieut. CYRIL N. ELLEN, D.F.C., R.A.F., was married on October 3 to GLADYS LILY, eldest daughter of Mr. and Mrs. GARDNER, of Highgate, at St. James's Church, Muswell Hill.

To be Married

The engagement is announced between Flight-Officer C. N. H. BILNEY, R.A.F., second son of Mr. and Mrs. W. A. Bilney, Monks' View, Newbury, Berks, and Miss NELLIE GARNER PERREN, elder daughter of the late Mr. Thomas Perren and Mrs. Perren, of Villa Rosa, Wilts.

Killed

Flying-Officer EDGAR THOMAS O'NEIL HOGBEN, R.A., who died on October 5 at Kohat, India, as the result of an aeroplane accident on October 2, was the son of Mrs. Hogben, Elmwood, Harrogate, and of the late Edgar Hogben, M.D., M.R.C.P., and younger brother of S. J. Hogben, of Katsina, N. Nigeria. His age was 26 years.

Death

Major RONALD SINCLAIR SMITH, late R.N.A.S. and R.A.F., died on October 8, at 54A, Redcliffe Square, S.W.10, of heart disease contracted in the Service.

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AERONAUTICAL RESEARCH COMMITTEE REPORTS

FROM the number of enquiries we receive it appears that there is a desire in aircraft circles to know approximately the contents of the various technical publications of the Aeronautical Research Committee. All the aircraft firms probably receive these reports regularly, whether or not they contain anything of immediate interest or utility. In the case of draughtsmen, however, and others interested in aeronautics, who can hardly be expected to purchase all the reports, the problem of deciding whether any publication interests him is often a difficult one. As it is obviously desirable that the knowledge of aeronautics should be made available to all who take an interest in the subject, we have arranged with the Air Ministry to publish in FLIGHT summaries of all the technical publications as soon as these are issued, or shortly before they are published. All A.R.C. publications can be purchased from H.M. Stationery Offices at Adastral House, Kingsway, London, W.C.2; 28, Abingdon Street, London, S.W.1; York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 120, George Street, Edinburgh, and through any bookseller.

Variation of Engine Power with Height. By H. L. Stevens, H. M. Garner, M.A., and W. G. Jennings, B.Sc., of the Royal Aircraft Establishment. Presented by the Director of Scientific Research. R. and M., Nos. 960 and 961. (E. 13 and E. 14.) August and September, 1924. Prices 9*d*. and 6*d*. net.

In calculating the performance of an aeroplane from flight tests it is essential to know the law of variation of engine power with height. In the past it has been usual to assume that the horse-power at various heights is in proportion to the density, but recent experiments as described in the present reports and memoranda suggest that the law governing the magnitude of the horse-power can be more accurately defined on a pressure basis. Whether this law will be finally accepted will depend upon the result of investigations now in progress at Martlesham in connection with a large number of types of aeroplane and engine.

The method used in previous investigations to determine the engine power at a given height (see R. and M., No. 462, "The Variation of Engine Power with Height," by D. H. Pinsent and H. A. Renwick, presented by the Superintendent, R.A.E.) involved the assumption that the airscrew did not twist under load. To avoid the necessity for this assumption a torquemeter which measured directly the torque of the engine was designed and fitted to a B.R.2 engine and observations of the torque obtained at different heights. Other experiments to supplement the work described in R. and M., No. 462, were made to determine the rate of climb, engine revolutions and air consumption on a D.H.9 with a 200 h.p. Siddeley-Puma engine under various conditions of pressure and temperature with a special airscrew designed not to twist under load (see R. and M., No. 960). In the experiments with a B.R.2 engine climbs were carried out at heights up to 17,000 ft. and partial climbs at different heights. Measurements of air speed, etc., were taken, and the engine torque as calculated was then plotted against pressure and density for different temperature ranges. As plotted, the experimental results suggest that the engine power is very nearly a function of the pressure only, except for low heights, where it depends to a certain extent on the temperature. A similar conclusion was reached in connection with the Siddeley Puma experiments where the law of engine power was proportional to some power of the pressure (p. 1–05 in this case) rather than some power of the density.

Experiments on Transmission of Air Waves through Pipes. By L. F. G. Simmons, B.A., A.R.C.Sc., and F. C. Johansen, B.Sc. R. and M., No. 957. (Ae. 176.) (13 pages and 8 diagrams.) January, 1925. Price 1*s*. net.

In many aeronautical researches it is desired to measure pressures at considerable distances from the points of observation. For this purpose it has frequently been customary to use long pipes, and this method is liable to introduce errors. The present paper deals with experimental work for measuring the corrections necessary for reducing the pressure and velocity measurements made in some full-scale work with diaphragm gauges connected with Pitot tubes by long pipes. Reference is also made to some theoretical work by Rayleigh, and it is proposed to undertake at a later date a further analysis based on a modified theory.

The experimental part of the investigation is divided into two parts. The first consists of measurements of pressure made with the usual type of diaphragm gauge, at the ends of pipes ranging up to 122 m. in length and to 0.95 cms. in diameter :—

(i) when a known pressure was suddenly applied at the near end, and
(ii) when a simple harmonic variation of pressure was impressed at the near end.

The second deals with experiments in which more precise methods were applied to the measurements of pressure along open and closed pipes when a harmonic displacement was imposed at the near end. Measurements of displacement were obtained by observing the motion of a soap film at the open end. The experiments were restricted to frequencies below 2.5 per second. The results indicate that the usual type of diaphragm gauge is unsuitable for the measurement of fluctuating pressures. A reduction in pressure and displacement and an increased lag in phase result (except where resonance occurs) from (1) an increase in the length of the pipe, (2) a decrease in the diameter of the pipe, (3) an increase in the speed of fluctuation.

Marked divergence between observed and calculated results show that existing formulæ relating to the transmission of sound waves through pipes cannot be successfully employed for correcting air pulsations of low frequency and finite amplitude.

THE ROYAL AIR FORCE

London Gazette, October 6, 1925

General Duties Branch

Wing-Comdr. J. B. Bowen, O.B.E., relinquishes his appointment as Deputy Director, Air Ministry; July 31.

The following are granted short service commns. as Pilot Officers on probation, with effect from and with seniority of the dates indicated :—P. R. Barwell, J. E. Bolt, E. G. Cayley, F. G. Downing, P. G. S. Gardiner, K. Garston-Jones, R. E. Hall, C. H. Jones, H. C. Kelly, G. W. Tuttle, S. H. White, W. L. Whitlock; Sept. 28. I. A. Anderson, F. F. Barrett, F. N. Garthwaite, D. J. Harrison, E. A. T. Murray; Sept. 30.

The following Pilot Officers on probation are confirmed in rank (Sept. 14) :—J. H. Barringer, J. S. Blomfield, E. E. Fallick, A. R. Feather, J. C. McE. Gibb, D. W. Gibbon, C. Heard-White, G. N. Hoar, J. W. M. Nancarrow, V. T. Norwood, A. L. R. Page, L. T. Pankhurst, S. C. Parker, C. H. Roberts (Lieut., A. and S. Hldrs., R.A.R.O.), E. G. H. Russell-Stracey, W. R. J. Spittle, F. B. Tomkins, C. J. Veevers, P. V. Williams.

The following Pilot Officers are promoted to rank of Flying Officer, with effect from dates indicated and with seniority of dates indicated in brackets :—H. M. Whittle, Sept. 15 (March 15). J. H. C. Wake; Sept. 17 (March 17). The following Pilot Officers are promoted to the rank of Flying Officer :—P. Stainer; July 10. B. F. H. Harding; Oct. 3. Sqdn.-Ldr. R. L. G. Marix, D.S.O., is restored to full pay from half-pay; Sept. 26.

The following are placed on half-pay, Scale A :—Group Capt. P. B. Joubert de la Ferté, C.M.G., D.S.O.; Oct. 4. Flight-Lieut. G. C. O'Donnell, D.F.C.; Sept. 20. Flight-Lieut. W. H. Ellison is placed on the retired list on account of ill-health; Oct. 7.

The following Flying Officers are transferred to the Reserve, Class A (Oct. 5) :—W. J. Buchanan, D.F.C.; C. W. Cudemore, M.C., D.F.C.

Flying Officer (hon. Flight-Lieut.) H. M. Burrows (Lieut., R.N., retd.) resigns his short-service commn.; Sept. 28. Flying Officer P. L. Binns (Lieut., R. Yorks Regt.) relinquishes his temp. commn. on return to Army duty; Sept. 25. Wing-Comdr. N. G. Darnell (Bvt.-Maj., K.S.L.I.) relinquishes his temp. commn. on being placed on half-pay (Army), on account of ill-health; Sept. 30. Sqdn.-Ldr. A. R. Boyle, O.B.E., M.C. (Capt., A. and S. Hldrs.), relinquishes his temp. commn. on retiring from the Army on account of ill-health caused by wounds, and is permitted to retain his rank; Aug. 1. Flying Officer D. P. Hadow, M.C., is dismissed the service by sentence of General Court-martial; Sept. 21.

Medical Branch

The following Flying Officers are promoted to the rank of Flight-Lieut. (Oct. 8) :—T. V. O'Brien, M.B.; F. W. G. Smith, M.B., B.A.

Reserve of Air Force Officers.

The following are granted commns. in Class A.A, General Duties Branch, as Pilot Officers on probation :—H. C. Barrett; Sept. 28. H. Wood, W. J. Youldon; Sept. 30. The following Pilot Officers are confirmed in rank (Oct. 1) :—R. A. Jacquot, A. J. Stubbings.

Flying Officer J. C. Dunbar is transferred from Class A to Class C; June 28. Flight-Lieut. J. O. Groves relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Oct. 7. Flying Officer T. C. Lowe, M.C., relinquishes his commn. on account of ill-health; Oct. 7. Pilot Officer C. A. J. Goodfellow relinquishes his commn. on account of ill-health; Oct. 7.

Errata: In FLIGHT, October 1, 1925, p. 645—*London Gazette*, September 15 should read *London Gazette*, September 25.

In notifications in *Gazette*, September 25, concerning appointments to short service commissions.—For Pilot Officers (for five years on the active list), read Pilot Officers on probation (for five years on the active list).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Air Commodore E. R. Ludlow-Hewitt, C.M.G., D.S.O., M.C., to R.A.F. Depot pending commencement of course at R.N. College, Greenwich; 1.10.25.

Wing Commander A. H. S. Steele-Perkins, O.B.E., to R.A.F. Depot, on transfer to Home Estab.; 31.8.25.

Squadron-Leaders: C. B. Cooke, to R.A.F. Depot, on transfer to Home Estab. 22.10.25. W. J. Ryan, C.B.E., to No. 99 Sqdn., Bircham Newton; 1.10.25. H. F. A. Gordon, O.B.E., to Air Ministry; 10.10.25. L. T. N. Gould, M.C., to No. 100 Sqdn., Spittlegate; 24.9.25. J. McCrae, M.B.E., to H.Q., Inland Area; 9.10.25. G. H. Hall, A.F.C., to No. 5 Flying Training Sch., Sealand; 5.10.25.

Flight-Lieutenants: A. W. Symington, M.C., to No. 6 Armoured Car Co., Iraq; 11.9.25. J. C. Foden, A.F.C., to remain at No. 58 Sqdn., Worthy Down, instead of to Inland Area Aircraft Depot, as previously notified.

Flying Officers: G. M. Trundle, to Heliopolis Details, Egypt; 27.8.25. J. L. Hayward, to Sch. of Tech. Training (Men), Manston, on transfer to Home Estab.; 8.10.25. (Hon. Flight-Lieut.) F. B. Lawrie, to Inland Water Transport Iraq; 11.9.25. N. T. Goodwin and C. C. Harris, to Aircraft Depot, India; 9.9.25.

Pilot Officers: H. W. Raeburn, H. B. Barrett and D. J. Lloyd, to Aircraft Depot, India; 9.9.25. H. Miller, to No. 216 Sqdn., Egypt; 15.9.25.

The undermentioned Pilot Officers are all posted on appointment to short service commissions (on probation) (28.9.25) :—P. R. Barwell, F. G. Downing and G. W. Tuttle, to No. 19 Sqdn., Duxford. J. E. Bolt, E. G. Cayley and R. E. Hall, to No. 29 Sqdn., Duxford. J. L. Chadwick, to No. 111 Sqdn., Duxford. G. P. S. Gardiner, C. H. Jones and W. L. Whitlock, to No. 23 Sqdn., Henlow. K. Garston-Jones, H. C. Kelly and S. H. White, to No. 3 Sqdn., Upavon. H. F. Gower, to No. 111 Sqdn., Duxford, on appointment to a short service commn. (on probation); 30.9.25. I. A. Anderson, F. F. Barrett, F. N. Garthwaite, D. J. Harrison and E. A. T. Murray, to No. 17 Sqdn., Hawkinge, on appointment to short service commns. (on probation); 30.9.25.

Stores Branch

Flight-Lieut. J. Lundon, to Stores Depot, Egypt; 5.9.25.

Flying Officers: R. G. Fussell, to No. 47 Sqdn., Egypt; 5.9.25. G. Scarrott, to H.Q. Special Reserve and Auxiliary A.F.; 9.10.25.

Medical Branch

Flying Officer (Dental): N. F. Smith, to Electrical and Wireless Sch. Flowerdown; 5.10.25.

The Schneider Cup Supermarine Racer Damaged

SOME considerable concern was caused in British aeronautical circles last week-end when news was received from Baltimore to the effect that the Supermarine-Napier S-4 racer had been damaged in the terrific gale, which swept over the north-east coast of America on Sunday. It appears that the canvas hangar, in which the machine was housed, collapsed and a falling pole fell on the tail, which was, in consequence, damaged. The damage, fortunately, is not, according to later cables received, of a very serious nature, and Mr. Mitchell states that it can be repaired before the race. While this mishap is undoubtedly unfortunate, it is stated that but for the efforts of those present the results might have been far more serious. It should be noted that all the other Schneider 'buses are also housed in canvas hangars.

Prague-London Flight

A FINE flight was accomplished last week by Lieut. Jira, of the Czechoslovak Army Air Service, who flew from Prague to London on an Avia B.H.10 monoplane, fitted with a 60 h.p. Walter engine. He left Prague on October 6 and had hoped to reach Croydon the same evening, but he was compelled to land at Boulogne on account of fog. He was unable to proceed until October 8, but eventually arrived safely at Croydon where he was received by a representative of the Czechoslovak Legation, and Commander H. Perrin of the Royal Aero Club, who congratulated him on his performance.

Sir Sefton Brancker Back

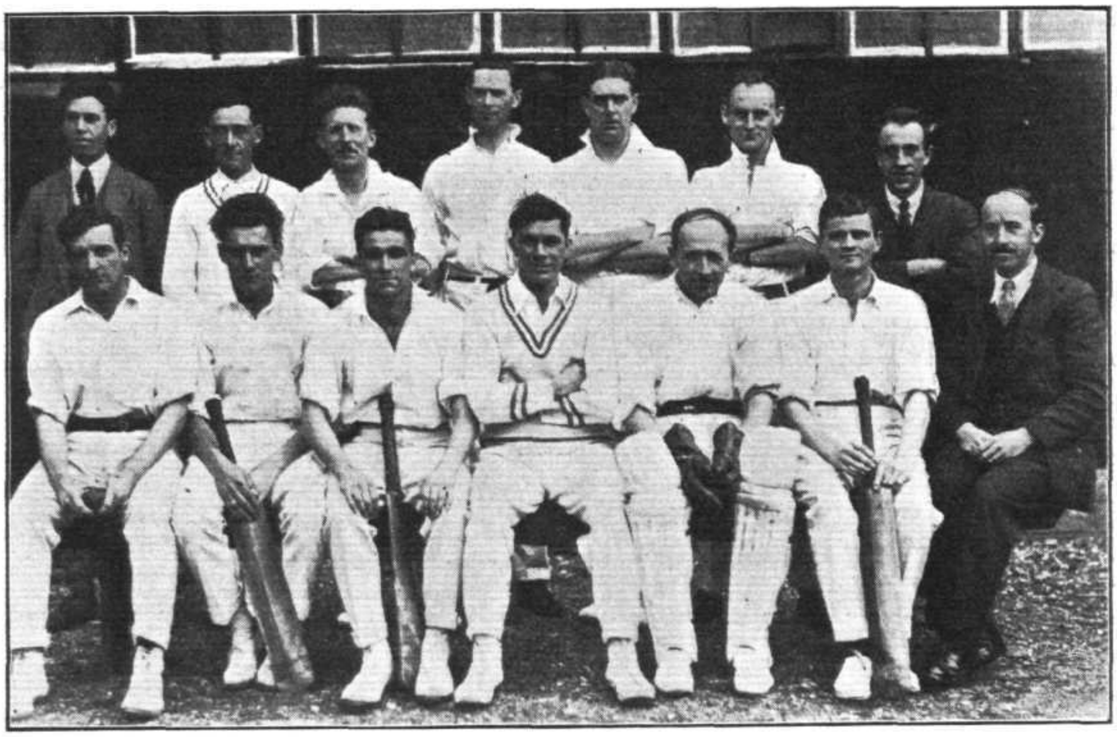
SIR SEFTON BRANCKER, Director of Civil Aviation, has concluded his tour of the East in connection with the Egypt-India air service, and arrived back in London on October 12, having flown from Brussels—where he has been attending the Air Congress—to Croydon in one of the Imperial Airways machines in company with Sir Samuel Hoare. He states that the tour has been quite successful, and on the signing of a suitable contract with Imperial Airways the air route from Egypt to India could be started. During his tour he had covered 3,000 miles, in about seven weeks, calling at Alexandria, Palestine, Baghdad, Bushire and Teheran.

The Pulitzer Trophy and a New Speed Record

IN America's big speed contest, the Pulitzer Trophy race, which was flown on October 12 (having been postponed from October 10) at Mitchell Field, Long Island, the winner, Lieut. Cyrus Bettis, U.S. Army Air Service, flying a special Curtiss Army Racer, fitted with 619 h.p. Curtiss engine, attained an average speed of 248·99 m.p.h. over the 124·27-mile (200 km.) course. This speed constitutes a world's record. Lieut. A. Williams, U.S. Navy, was second, with a speed of 241·71 m.p.h., on a similar machine. The opening of the New York Air Meet (of which the Pulitzer race was the main event) on October 8, was marred by an accident to one of the competing machines in the first event—the Free-for-all race for 2-seater low-powered machines—resulting in the death of the passenger named Buranelli (? designer of "Remington-Burnelli biplane) and serious injury to the pilot, C. D. Chamberlain. We hope to give further details of the meeting in a subsequent issue of FLIGHT.

Midland Aero Club Opened

THE Lord Mayor of Birmingham, Alderman Percival Bower, president of the Midland Aero Club, reopened the aerodrome at Castle Bromwich on October 6, for flying in connection with this club—one of those formed under the Air Ministry's light aeroplane scheme. He also accepted three Sopwith "Pups," with 80-h.p. engines, the gift of Mr. James Palethorpe, a Midland flying enthusiast. The club has two De Havilland Moth light aeroplanes, and the Siddeley Company have sent over two of their latest machines for the use of the members.



The Supermarine cricket XI: Left to right (back row): H. R. Robinson, A. R. J. White, G. Glyde, C. Johns, R. Amey, J. Smith, J. Hawkins. Front row: R. Williams, C. Gadge, R. Haslam, E. Francis (Capt.), W. Lucas, G. Goble, and E. W. Marshall, Hon. Sec., Sports Club.

SUPERMARINE SPORTS AND SOCIAL CLUB

THE cricket section of the Supermarine Sports and Social Club has had a strenuous season, and the following list of matches played by the Supermarine XI shows that a number of games have been played between this XI and the R.A.F. at Farnborough, and various other R.A.F. stations. The following are the results of the various matches, and it is worthy of note that, out of a total of 14 matches, 8 were won and 1 drawn, a record of which Supermarines may well be proud.

May	9	Bournemouth Amateurs	Home	Lost by 23 runs.
,,	16	Cunard Sports	Home	Drawn.
,,	23	R.A.F. Calshot	Away	Lost by 115 runs.
,,	30	Municipal Officers ..	Home	Lost by 36 runs.
June	6	R.A.F. Worthydown ..	Home	Won by 16 runs.
,,	13	,, ,, ..	Away	Lost by 59 runs.
,,	27	R.A.F. Calshot	Home	Lost by 148 runs.
July	4	R.A.F. Farnborough ..	Home	Won by 31 runs.
,,	8	Fairey Aviation Works	Home	Won by 55 runs.
,,	15	Weston Park	Home	Won by 22 runs.
,,	18	Wellington House (London)	Home	Won by 97 runs and innings.
,,	25	Bournemouth Amateurs	Home	Won by 1 wicket
Aug.	15	R.A.F. Farnborough ..	Away	Won by 65 runs
,,	29	Bournemouth Amateurs	Away	Won by 13 runs and innings.

IMPORTS AND EXPORTS, 1924-1925

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; for 1920, see "FLIGHT" for January 13, 1921; for 1921, see "FLIGHT" for January 19, 1922; for 1922 see "FLIGHT" for January 18, 1923; for 1923, see "FLIGHT" for January 17, 1924; and for 1924, see "FLIGHT" for January 22, 1925.

	Imports.		Exports.		Re-Exports.	
	1924.	1925.	1924.	1925.	1924.	1925.
	£	£	£	£	£	£
Jan. ..	2,213	3,546	52,239	83,728	2,219	291
Feb. ..	920	985	26,349	85,639	335	20
Mar.	11,381	—	34,113	56,881	509	9,355
Apr. ..	373	321	56,998	78,041	6,014	6,732
May ..	3,426	560	125,138	74,844	4,162	15,278
June ..	1,219	190	87,629	71,009	2,115	667
July ..	1,510	184	179,292	159,262	2,708	870
Aug. ..	687	469	247,982	113,054	950	—
Sept.	4,383	1,224	67,749	111,237	641	213
	26,112	7,479	877,489	833,695	19,653	33,426

PUBLICATIONS RECEIVED

Aeronautical Research Committee, Reports and Memoranda: *No.* 425.—Model Drogue Experiments. By G. S. Baker. April, 1918. Price 9*d.* net. *No.* 974 (*M.*29).—Report on the Use of Artificial Sources of Light as a Substitute in the Weathering of Fabric. Part I. By W. G. Glendinning. July, 1925. Price 6*d.* net. H.M. Stationery Office, Kingsway, London, W.C.

The Strength of Materials. By John Case. Edward Arnold & Co., 41-43, Maddox Street, London, W.1. Price 30*s.* net.

The Air Pilot Monthly Supplement, No. 12. *October*, 1925. The Air Ministry, Kingsway, London, W.C.2.

Rivista Aeronautica. Vol. I, No. 2. *August*, 1925. Direzione della "Rivista Aeronautica," Via Torino, 39, Rome. Price 50 lire.

Catalogue

Morris Hand Overhead Cranes. Herbert Morris, Ltd., Loughborough.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1924

Published October 15, 1925

16,232. J. KEEGAN. Aeroplane propellers. (239,961.)
16,666. C. COOK. Rotary engine. (239,966.)
17,120. BLACKBURN AEROPLANE AND MOTOR CO., LTD., and F. A. BUMPUS. Folding wings for aeroplanes. (239,971.)
22,122. ARMSTRONG SIDDELEY MOTORS, LTD., and H. N. WYLIE. Wings, etc. (240,001.)
27,553. A. LAMBLIN. Cooling-radiators. (228,111.)

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